



# REPORT

## MONSANTO SELENIUM WATER TREATMENT

### Pilot Test Plan, Revision 1

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## Table of Contents

1.0	INTRODUCTION AND TESTING OBJECTIVES.....	1
2.0	PROJECT PARTICIPANTS .....	2
3.0	PILOT SYSTEM OPERATIONS AND TEST PLAN.....	3
3.1	Pilot Structure.....	3
3.2	Influent and Effluent Waters.....	3
3.3	ABMet Pilot Treatment System Description.....	3
3.3.1	ABMet Pilot Test Runs.....	5
3.3.2	ABMet Inoculation and Start-Up .....	5
3.3.3	ABMet Continuous Operations .....	5
3.3.4	ABMet Remote Communications Equipment .....	5
3.4	RO Pilot System Description.....	5
3.4.1	RO Pilot Test Runs .....	6
4.0	SAMPLING AND ANALYTICAL PLAN .....	7
4.1	Sampling and Field Equipment .....	7
4.2	Sampling Locations.....	7
4.2.1	ABMet Sampling Locations.....	7
4.2.2	RO Sampling Locations .....	7
4.3	Analytical Sampling.....	8
4.3.1	ABMet Analytical Sampling.....	8
4.3.2	RO Analytical Sampling .....	3
4.3.3	Non-Routine Sampling.....	4
4.4	Sample Labels.....	4
4.5	Duplicate, Blank, and Split Sample Guidelines.....	4
4.6	Sample Collection .....	5
4.6.1	ABMet Sampling Procedure.....	5
4.6.2	RO Sampling Procedure .....	5
5.0	PILOT LOGS.....	6
6.0	COMMUNICATION PLAN.....	7
6.1	Operations and Maintenance Communication.....	7
6.2	Data Communication.....	7
7.0	HYDROGEN SULFIDE AWARENESS.....	9
8.0	CLOSING .....	10

## List of Figures

Figure 1	Water Treatment Pilot Test Site
Figure 2	Well Location Map
Figure 3	Pilot Block Flow Diagram





## List of Tables

Table 1	Pilot Project Participants and Contact Information
Table 2	ABMet Pilot Sampling Locations and Description
Table 3	RO Pilot Sampling Locations and Description
Table 4	ABMet Analytical Suite for the Influent and Effluent
Table 5	RO Analytical Suite for the Influent, Permeate and Brine
Table 6	Pilot Participants to be included in General Communications

## List of Attachments

Attachment A	Pilot Equipment and Structure Proposals
Attachment B	Temporary Water Right for TW-75
Attachment C	Scope of Installation
Attachment D	Pilot Drawings
Attachment E	Equipment List
Attachment F	Sample and Analytical Plans
Attachment G	Chain of Custody Forms
Attachment H	Daily Logs





## List of Acronyms and Abbreviations

ABMet	ABMet pilot treatment system
Al	aluminum
ASC	Applied Speciation and Consulting, LLC
Ba	barium
Br	bromine
Ca	calcium
Cd	cadmium
Cl	chlorine
COC	chain of custody
COD	chemical oxygen demand
BOD	biological oxygen demand
D	diameter
DI	deionized water
EBCT	empty bed contact time
F	fluorine
Fe	iron
GAC	granular activated carbon
gal	gallons
gpm	gallons per minute
GE	GE Water and Process Technologies
H	height
IDLH	Immediately Dangerous to Life or Health
in	inches
K	potassium
L	length
Mg	magnesium
Mn	manganese
Na	sodium
O&M	operations and maintenance
ORP	oxidation reduction potential
RO	reverse osmosis treatment system
P&ID	piping and instrumentation diagram
PLC	programmable logic controller
QA/QC	quality assurance and quality control
SAP	sampling and analytical plan
SDI	silt density index
Se	selenium
Si	silicon
SO <sub>4</sub>	sulfate
Sr	strontium
SVL	SVL Analytical, Inc.
TCLP	toxicity characteristic leaching protocol
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
TW	test well
W	width
WET	whole effluent toxicity





## 1.0 INTRODUCTION AND TESTING OBJECTIVES

This pilot test and operations plan has been prepared by Golder Associates Inc. (Golder) as a guide for operation, monitoring, and sampling of the GE Water and Process Technologies (GE) ABMet pilot treatment system (ABMet) and GE reverse osmosis system (RO). The information below has been compiled from operational experience and from the pilot treatment proposal from GE: PIL-746517.Rev 4 (July 10, 2014) (Attachment A). For the pilot test, two wells, TW-58 and TW-75, will be pumped under water rights from the State of Idaho; TW-75 will be a temporary right (Attachment B). Monsanto is in the process of modifying their existing water right to include TW-58; testing for TW-58 is pending until their water right is updated.

Water from TW-75 will be treated using the ABMet technology; flow rates will range from 1 to 10 gpm. The ABMet technology relies on anaerobic microbial reduction of oxidized forms of selenium to particulate, elemental selenium. In the ABMet system, elemental selenium is retained with the biomass, and then washed out of the bioreactor when the system is backwashed. A slip stream from TW-58 will be treated using the RO system; flow rates will range from 5 to 10 gpm. The RO system physically separates selenium and other constituents from the influent stream leaving a relatively clean stream (permeate) and a waste stream (brine) containing the selenium. All streams, the treated effluent and separated waste streams (brine and backwash from ABMet technology), will be consumed in the Plant Evaporative process water circuit.

The primary objectives of the pilot test program include the following:

- Evaluating selenium treatment and removal using ABMet and RO technologies for achievement of a low effluent selenium concentration of 5 ug/L.
- Evaluating the minimum empty bed contact time (EBCT) needed for bioreactor treatment, including the relationship between EBCT and influent and effluent concentrations for the ABMet technology.
- Determine the appropriate design basis for a full-scale system including required nutrient dosage for the ABMet technology and acid dosage for the RO technology.

Secondary testing objectives include:

- Evaluating selenium speciation during treatment.
- Developing and optimizing operating parameters such as backwash and de-gassing frequencies for the ABMet pilot.
- Evaluating the presence and treatment of additional parameters of interest: cadmium, manganese, nitrate, molybdenum, chloride, organics that may be generated in the ABMet system, and potential scaling parameters such as metals and silica for the RO system.





## 2.0 PROJECT PARTICIPANTS

A list of project participants and contact information is included in Table 1.

**Table 1: Pilot Project Participants and Contact Information**

Name of Person & Affiliation	Project Role	Phone Number & E-mail
Tom Rutkowski Golder Associates	Golder Project Manager	(w) 720-920-4630 (m) 303-587-7384 <a href="mailto:trutkowski@golder.com">trutkowski@golder.com</a>
Paul Pigeon Golder Associates	Golder Water Treatment Lead	(w) 720-920-4617 (m) 720-252-9835 <a href="mailto:ppigeon@golder.com">ppigeon@golder.com</a>
Karen Budgell Golder Associates	Golder Process Engineer Lead	(w) 720-920-4640 (m) 720-233-3717 <a href="mailto:kbudgell@golder.com">kbudgell@golder.com</a>
Victor Wirick Golder Associates	Golder Operations Lead	(w) 720-920-4631 (m) 303-562-5507 <a href="mailto:vwirick@golder.com">vwirick@golder.com</a>
Nick Heiner GE Water & Process Technologies	GE Project Manager	(m) 801-557-5779 <a href="mailto:Nick.Heiner@ge.com">mailto:Nick.Heiner@ge.com</a>
Paul Dilallo GE Water & Process Technologies	GE Sales Manager	(w) 262-200-2111 (m) 414-403-1897 <a href="mailto:Paul.Dilallo@ge.com">Paul.Dilallo@ge.com</a>
Chris Luther GE Water & Process Technologies	GE Process Lead	(m) 705-748-8085 <a href="mailto:Chris.Luther@ge.com">Chris.Luther@ge.com</a>
Dave Erickson GE Water & Process Technologies	GE Field Service	(m) 801-244-2211 <a href="mailto:Dave.Erickson1@ge.com">Dave.Erickson1@ge.com</a>
Minggang Liu GE Water & Process Technologies	GE Process Engineer	(w) 905-465-3030 <a href="mailto:Minggang.Liu@ge.com">Minggang.Liu@ge.com</a>
Nelson Fonseca GE Water & Process Technologies	GE Product Manager	(w) 905-465-3030 <a href="mailto:Nelson.Fonseca@ge.com">Nelson.Fonseca@ge.com</a>
Jason Maughan Monsanto	Monsanto Project Manager	<a href="mailto:jason.maughan@monsanto.com">jason.maughan@monsanto.com</a>
Ryan Yamauchi Monsanto	Monsanto Engineering Lead	<a href="mailto:ryan.p.yamauchi@monsanto.com">ryan.p.yamauchi@monsanto.com</a>
Jim McCulloch Monsanto	Monsanto	<a href="mailto:james.r.mcculloch@monsanto.com">james.r.mcculloch@monsanto.com</a>

Note: GE ABMet system will be monitored remotely by GE personnel who will communicate with Golder site operations personnel any operational actions that need be taken. Routine monitoring of RO operations will be by Golder operators, using a set of operating directions and data recording requirements provided by GE. GE personnel will visit the site routinely for system maintenance / operational checks.





### 3.0 PILOT SYSTEM OPERATIONS AND TEST PLAN

The pilot units will be installed at the Soda Springs Plant near TW-75, shown in Figure 1. A table outlining scope for installation of the pilot is provided in Attachment C.

#### 3.1 Pilot Structure

The units will be sheltered with a 30 ft by 30 ft non-insulated Sprung Structure (proposal in Attachment A) consisting of an aluminum frame and tensioned membrane cover. Heaters will be utilized for climate control. A general arrangement (GA) is provided in Attachment D. Also, Attachment D contains the P&ID, a site plan showing the piping connections to the pilot, and electrical drawings, which include a load list, one line diagram and locations of the power panel and circuit connections on the pilot GA. An equipment list is provided in Attachment E.

The ABMet Tower, ABMet Effluent Tank and Spent Backwash Collection Tank are potential sources of hydrogen sulfide release; the sulfide is generated in the anaerobic treatment process. The tower and tanks will be closed and vented to the outside of the structure above the rooftop. Also, the inside of the structure will be actively ventilated with a make-up air unit (proposal in Attachment A) to provide a second engineering control against an accumulation of hydrogen sulfide. In addition, fixed and personal monitors equipped with alarms will be used.

#### 3.2 Influent and Effluent Waters

The source of influent water to the ABMet system will be TW-75 and the source of influent water to the RO unit will be TW-58. The test well locations are shown in Figure 2. The effluent from both pilot units including waste streams (ABMet backwash and RO brine) will be discharged into an effluent collection tank. The effluent collection tank will be equipped with a sump pump that will discharge to the Underground Holding Tank. Water from the Underground Holding Tank will be consumed in the Plant Evaporative process water circuit. A block flow diagram is presented in Figure 3. Both pipelines supplying water to the pilot site from the wells will be buried for cold weather protection.

#### 3.3 ABMet Pilot Treatment System Description

The ABMet pilot treatment system is comprised of the following components:

- ABMet Equalization Tank – 1,000 gallons (gal) – 64 in (D) x 77.5 in (L);
- Reactor System – 47 3/4 inches (in) (width (W)) x 75 in (length (L)) x 196 1/8 in (height (H));
- ABMet Effluent Tank – 1,550 gal – 87 in (diameter (D)) x 67 in (H);
- Spent Backwash Tank (cone bottom) – 500 gal – 52 in (D) x 81 in (H);
- Nutrient Storage Tote – 36 in (W) x 46 in (L) x 46 in (H);
- Effluent Collection Tank – 600 gal – 42”(D) x 101.5”(L); and
- Effluent Pump. Submersible, 80 gpm, with high-high level alarm





The reactor system houses the following major components:

- ABMet Feed Pump;
- Bioreactor vessel including granular activated carbon (GAC) (ABMet Tower);
- Nutrient Feed Pump;
- Backwash Pump;
- Process control valves and instrumentation; and
- Control system with mobile broadband access.

The ABMet is designed to operate at flow rates ranging from 1 to 10 gallons per minute (gpm). Influent flow rate is controlled by a variable speed centrifugal pump. GE personnel will determine the influent flow rate based on a preliminary estimate of the required hydraulic retention time. This parameter will likely be adjusted during the course of the pilot test to vary EBCT and determine the minimum EBCT, corresponding to the highest influent flow rate, which provides high efficiency removal of selenium meeting the primary pilot objective.

A small dosing pump controls the nutrient feed rate. GE will vary the feed rate to achieve the optimum ORP in the bioreactor.

Groundwater will be pumped from TW-75 into a break tank at the pilot location via a submersible well pump. The break tank will provide flooded suction for the influent pump and includes an overflow that will be routed to the Effluent Collection Tank along with treated effluents and treatment waste streams.

Influent flow to the reactor vessel is dosed with a proprietary GE nutrient mixture, including organic carbon, nitrogen and phosphorus, and mixed with an inline static mixer before entering the reactor vessel. The reactor vessel is filled to approximately 100 inches with GAC. An external overflow standpipe with level control valve at approximately 156 inches and open-to-atmosphere (and vented to the outside) overflow at 178 inches maintains the static head over the biologically active GAC bed for proper filtration. A filter underflow assembly collects the filtered effluent and directs it to a ABMet Effluent Tank. The ABMet Effluent Tank is fitted with an overflow, at a volume of approximately 1,550 gallons, and is routed to the Effluent Collection Tank.

A backwash pump that delivers 70 gpm will be used to de-gas and backwash the GAC filter on intervals determined by GE pilot operations management based on review of headloss data for the bioreactor. The de-gas operation will occur automatically according to the settings in the programmable logic controller (PLC); at first, the reactor vessel will degas every two days. The backwash sequence will be performed manually by on-site (Golder or Monsanto) operations personnel as directed by GE operations managers on a schedule determined by the bioreactor headloss and treatment effectiveness trends. All backwash and de-gas waste will be directed to the Spent Backwash Tank and then discharged to the Underground





Storage Tank via the Effluent Collection Tank. The water from the Underground Holding Tank will be pumped to the Plant Evaporative process water circuit for consumption.

### **3.3.1 ABMet Pilot Test Runs**

The ABMet pilot treatment system will be operated for approximately three months in two phases:

1. Plant startup and inoculation
2. Continuous operation treating raw water

### **3.3.2 ABMet Inoculation and Start-Up**

Monsanto personnel are responsible for transporting the ABMet pilot from the site front gate to the pilot test site, and installing the required electrical power. Monsanto is responsible for preparing a level test pad for the ABMet unit and providing a crane to place the unit at the test site and man lift to load the GAC media into the bioreactor. Golder is responsible for plumbing influent and effluent connections, influent pumps, pilot drain connections, and nutrient connections. A team of Monsanto and Golder personnel will load the GAC into the reactor vessel given that a man lift is required. Once GE operations management has been notified ABMet is installed, they will mobilize to the site to inoculate the reactor vessel. At this time GE operations management will also train Golder and Monsanto on the operation of the pilot.

### **3.3.3 ABMet Continuous Operations**

GE operations management will monitor the operation of the ABMet system remotely and will adjust influent flow rates to test different EBCTs for their system. GE project management may also adjust the nutrient feed rates based on the system effectiveness. Flow rates and EBCTs for the ABMet system have not been provided by GE at this time. GE will provide all chemicals and bacterium for the operation of the ABMet system.

### **3.3.4 ABMet Remote Communications Equipment**

The ABMet remote communications equipment will use a modem with cellular connectivity at the pilot location, with the modem and cellular antenna mounted on the outside of the pilot structure.

## **3.4 RO Pilot System Description**

The RO pilot treatment system is comprised of the following components:

- RO Equalization Tank – 1,000 gal – 64 in (D) x 77.5 in (L);
- RO Sump Pump;
- RO System – 27 in (W) x 28 in (D) x 65 in (H);
- Acid Supply Tank; and
- pH Control System – Dosing pump, 60 liter day tank and pH probe.





The RO system houses the following major components:

- Cartridge filters;
- Flow meters;
- RO Feed pump;
- RO membranes; and
- Process control valves and instrumentation.

The RO system is designed to operate at an influent flow rate ranging from 5 to 10 gpm. The RO will be operated at approximately a 75 percent recovery (permeate flow rate as a percentage of influent flow rate).

A slip stream from the TW-58 pipeline near the pilot location will be pumped into the RO Equalization Tank at the pilot location via a submersible pump. The tank will provide flooded suction for the RO Feed Pump and includes an overflow that will be routed back to the Effluent Collection Tank. From the RO Equalization Tank, the water is pumped through a series of cartridge filters and then to the RO. Acid is added inline before the cartridge filters. The RO permeate and brine will be discharged to the Underground Storage Tank via the Effluent Collection Tank. The water from the Underground Holding Tank will be pumped to the Plant Evaporative process water circuit for consumption.

### **3.4.1 RO Pilot Test Runs**

The RO pilot system will be operated for approximately one month. Conditions may be varied based on initial results.

Monsanto personnel are responsible for off-loading the RO pilot at the pilot test site, transporting the RO pilot equipment into the structure and installing the required electrical power. The RO pilot will be placed on the same level test pad as the ABMet unit. Golder is responsible for plumbing influent and effluent connections, influent pumps, pilot drain connections, and acid connections. Once the RO system is set up, GE operations management will train Golder and Monsanto on the operation of the pilot.

Operations personnel will record operating data daily as the system is not equipped with remote monitoring capability.





## 4.0 SAMPLING AND ANALYTICAL PLAN

Golder operators will be responsible for collecting, testing, and shipping water quality samples to an analytical laboratory for both the ABMet and RO pilot treatment systems. Analytical samples will be collected in laboratory bottles and transported under chain-of-custody protocols for analysis. Field measurements will be performed onsite using calibrated field meters.

### 4.1 Sampling and Field Equipment

The following sampling and field equipment is required:

- Calibrated field meters capable of reading pH, temperature, conductivity, oxidation-reduction potential, and dissolved oxygen (percent saturation and concentration);
- Sample containers, filter apparatus and filters, ice, and preservatives (nitric acid, sulfuric acid, sodium hydroxide/zinc acetate, to be supplied by the analytical lab); and
- Plastic beakers for measurement of field parameters.

### 4.2 Sampling Locations

Samples will be collected from up to three different locations in the ABMet treatment system and three locations in the RO pilot. Sampling locations are shown in Figure 3

#### 4.2.1 ABMet Sampling Locations

The ABMet sampling names and locations are summarized in Table 2. Influent raw water and effluent treated water will be sampled. In addition, the spent backwash water will be sampled two times during the pilot period to assess how much biomass and selenium are released during high-rate backwashing.

**Table 2: ABMet Pilot Sampling Locations and Description**

Location Name	Sample Location	Location
SP100	Influent to ABMet	After ABMet Equalization Tank
SP200	Effluent from ABMet	After ABMet Backwash/Effluent Tank
SP300	Spent Backwash	Spent backwash cone bottom tank
SP400	Blind duplicate	Will vary based on sampling plan

#### 4.2.2 RO Sampling Locations

The RO sampling names and locations are summarized in Table 3. Influent raw water and effluent water (permeate and brine) will be sampled.



**Table 3: RO Sampling Locations and Description**

Location Name	Sample Location	Location
SP500	Influent to Cartridge Filters	After RO Equalization Tank
SP600	Permeate from RO	After RO
SP700	Brine from RO	After RO
SP800	Blind duplicate	Will vary based on sampling plan

### 4.3 Analytical Sampling

Attachment F contains summaries of the analytical suites and sampling frequencies for the two pilots. The summary tables are preliminary; as the pilot treatment project progresses, sampling frequencies may change. If changes are necessary to the sampling program, a revised table will be prepared. A sampling and analytical plan (SAP) describing the sampling to be performed each week will also be provided to the operators weekly.

Selenium samples will be submitted for analysis to Applied Speciation and Consulting, LLC (ASC) located in Bothell, Washington, for analysis. All other analytical samples, including selenium duplicates, will be submitted for analysis to SVL Analytical, Inc. (SVL) located in Kellogg, Idaho. The laboratory addresses are listed below and chain of custody (COC) forms are included in Attachment G.

Applied Speciation and Consulting, LLC  
18804 Northcreek Parkway  
Bothell, WA 98011 USA  
[www.appliedspeciation.com](http://www.appliedspeciation.com)  
425-483-3300

SVL Analytical, Inc.  
One Government Gulch  
Kellogg, ID 83837  
[www.svl.net](http://www.svl.net)  
208-784-1258

#### 4.3.1 ABMet Analytical Sampling

Sampling and analysis of key parameters will be used to assess selenium removal and overall pilot performance. In addition to monitoring selenium, monitoring of nutrient and organic concentrations are required for the ABMet system since nutrients are being added to the system. Parameters of interest, cadmium and manganese will also be monitored. The influent and effluent will be sampled three times a week: the “long list” will be sampled once a month and the “short list” will be sampled three times a week. The long list and short list are provided in Table 4.



**Table 4: ABMet Analytical Suite for the Influent and Effluent**

Long List - Monthly	Short List (Monday, Wednesday, Friday)
Field Parameters <sup>1</sup>	Field Parameters <sup>1</sup>
pH	pH
Temperature	Temperature
Conductivity	Conductivity
ORP	ORP
DO	DO
Analytical Parameters	Analytical Parameters
Se, Total <sup>2</sup>	Se, Total
Se, Dissolved (0.45 micron filter)	Se, Dissolved (0.45 micron filter)
Selenium speciation	Nitrate
Se, Dissolved (0.1 micron filter)	Sulfide
Metals, Total - Ca, Cd, Mn, Mo	COD
Metals, Dissolved - Ca, Cd, Mn, Mo	
Nitrate	
Nitrite	
Sulfate	
Sulfide	
Orthophosphate	
COD	
BOD, total	
BOD, soluble	
TOC	
Alkalinity	
TDS	
TSS	
Chloride	

**Notes:**

<sup>1</sup>. Flow rate and instrument monitoring will also be required as detailed in operation manuals.

<sup>2</sup>. Parameters in purple will be submitted to ASC. All other analytical parameters will be sent to SVL.

Field blanks consist of a set of sample bottles filled with DI water in the field during sampling and will be collected at a rate of 5%.

Blind duplicates consist of an additional set of sample bottles filled with process water during sampling and will be collected at a rate of 10%.

Once a month, split selenium samples will be sent to ASC and SVL for comparison. One time during pilot testing, a sample of spent backwash will be collected and analyzed using the long list of parameters. If sufficient waste is generated in the cone bottom tank a sample will be collected one time for analysis of toxicity characteristics hazardous waste





#### 4.3.2 RO Analytical Sampling

Scaling parameters include certain metals and silica and will be monitored in addition to selenium for the RO system. Parameters of interest, cadmium manganese, nitrate, molybdenum, and chloride will also be monitored. The influent, permeate and brine will be sampled three times a week: the “long list” will be sampled once a week, and the “short list” will be sampled twice a week. The long list and short list are provided in Table 5. Dissolved parameters do not need to be analyzed in the permeate samples.

**Table 5: RO Analytical Suite for the Influent, Permeate and Brine**

<b>Long List - Weekly (Monday)</b>	<b>Short List (Wednesday, Friday)</b>
<b>Field Parameters<sup>1</sup></b>	<b>Field Parameters<sup>1</sup></b>
pH	pH
Temperature	Temperature
Conductivity	Conductivity
SDI	
<b>Analytical Parameters</b>	<b>Analytical Parameters</b>
	Se, Total
Se, Total <sup>2</sup>	Se, Dissolved <sup>3</sup> (0.45 micron filter)
Se, Dissolved <sup>3</sup> (0.45 micron filter)	
Metals, Total - Al, Ba, Ca, Cd, Fe, Mg, K, Mn, Mo, Na, Si, Sr	
Metals, Dissolved <sup>3</sup> - Al, Ba, Ca, Cd, Fe, Mg, K, Mn, Mo, Na, Si, Sr	
Anions - Br, Cl, F, SO <sub>4</sub>	
Alkalinity	
Hardness	
Nitrate	
Silica	
TDS	
TSS	

**Notes:**

1. Flow rate and instrument monitoring will also be required as detailed in operation manuals.

2. Parameters in purple will be submitted to ASC. All other analytical parameters will be sent to SVL.

3. No dissolved metals analysis on permeate stream.

Field blanks consist of a set of sample bottles filled with DI water in the field during sampling and will be collected at a rate of 5%.

Blind duplicates consist of an additional set of sample bottles filled with process water during sampling and will be collected at a rate of 10%.

Once a month, selenium speciation will be analyzed and split selenium samples will be sent to ASC and SVL for comparison.





#### 4.3.3 Non-Routine Sampling

Non-routine sampling, such toxicity characteristic leaching protocol testing (TCLP) and whole effluent toxicity (WET) testing may be required during pilot testing. Any non-routine sampling undertaken will be compliant with Idaho regulations. These tests will be scheduled on an as-needed basis, and at a minimum, the following testing will be performed:

- WET Testing: WET testing can be performed on the treated ABMet effluent and RO permeate at least once during pilot testing.
- TCLP Testing: TCLP testing will be performed once on residuals that may require land disposal, including ABMet backwash.

#### 4.4 Sample Labels

Samples should be named according to the sample location. Duplicates should have the prefix “SP400” for the ABMet system, and “SP800” for the RO system. Field blanks should have the prefix “SP900” and their identity should be noted in the field observation sheet. Examples are shown below:

- ABMet Effluent = SP200
- ABMet Blind Duplicate = SP400
- RO Blind Duplicate = SP800
- Blind Field Blanks = SP900

#### 4.5 Duplicate, Blank, and Split Sample Guidelines

Duplicate, blank, and split samples will be collected for the duration of testing to provide quality assurance and quality control (QA/QC) for analytical data. QA/QC samples will be collected at the following rates, and sampling events will be indicated in the weekly sampling plan:

- Blind duplicate samples will be collected for 10% of sampling events
- Field blank samples will be collected for 5% of sampling events
- Split samples for selenium will be collected twice per month
  - Samples will be split between ASC and SLV
- Hach test kit split samples will be collected for 20% of sampling events
  - Sampling frequency may be reduced if good agreement between splits is observed

QA/QC samples should be recorded on the field observation sheet and should follow these general guidelines:

- Duplicate samples should be collected in one container and then split between sampling bottles to ensure homogeneous sampling.
  - Blind duplicates should be sent to the same lab without indicating the sample is a duplicate to prevent bias.





- Field blank samples consist of a full set of sample bottles filled with deionized water. The bottles should be filled in the field during the course of a regular sampling event.
  - Field blanks should be sent to the same lab without indicating the sample is a field blank to prevent bias.
- Split samples should be collected in one container and then split between sampling bottles to ensure homogeneous sampling.
  - Selenium split samples should be sent to separate labs for analysis.
  - Hach test kit split samples should be analyzed by the test kit and an analytical laboratory.

## 4.6 Sample Collection

### 4.6.1 ABMet Sampling Procedure

ABMet samples will be taken at sampling locations inside the pilot enclosure with adequate mechanical ventilation. It is possible hydrogen sulfide will be present in the effluent flow. Operators will wear personal gas monitors while sampling the ABMet pilot treatment system.

### 4.6.2 RO Sampling Procedure

RO samples will be taken at sampling locations; there is no concern with hydrogen sulfide generation for the RO system.





## 5.0 PILOT LOGS

Daily logs for operations and maintenance, as well as a visitor log are included in Attachment H. Daily logs should be completed on days when an operator is present at the pilot. Pilot access should be restricted to authorized personnel only and all visitors must sign the visitor log.





## 6.0 COMMUNICATION PLAN

Good communication is critical to successful pilot operations. The persons listed in Table 6 should be included on all email communications.

**Table 6: Pilot Participants to be included in General Communications**

Person	Project Role	Email
Tom Rutkowski	Golder Project Manager	<a href="mailto:trutkowski@golder.com">trutkowski@golder.com</a>
Paul Pigeon	Golder Water Treatment Lead	<a href="mailto:ppigeon@golder.com">ppigeon@golder.com</a>
Karen Budgell	Golder Process Engineer Lead	<a href="mailto:kbudgell@golder.com">kbudgell@golder.com</a>
Victor Wirick	Golder Operations Lead	<a href="mailto:vwirick@golder.com">vwirick@golder.com</a>
Nick Heiner	GE Project Manager	<a href="mailto:Nick.Heiner@ge.com">Nick.Heiner@ge.com</a>
Paul Dilallo	GE Sales Manager	<a href="mailto:Paul.Dilallo@ge.com">Paul.Dilallo@ge.com</a>
Chris Luther	GE Process Lead	<a href="mailto:Chris.Luther@ge.com">Chris.Luther@ge.com</a>
Minggang Liu	GE Process Engineer	<a href="mailto:Minggang.Liu@ge.com">Minggang.Liu@ge.com</a>
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Jim McCulloch	Monsanto	<a href="mailto:james.r.mcculloch@monsanto.com">james.r.mcculloch@monsanto.com</a>

### 6.1 Operations and Maintenance Communication

The following bullet points provide guidance for operations and maintenance (O&M) communications:

- GE operations management and Golder will be notified, by e-mail, of maintenance or operational issues with the ABMet and/or RO system within 24 hours of the incident occurring.
- If GE operations management communicates directly with the operators to resolve operational or maintenance issues, the operator will send out an email summary of the work performed within 24-hours of resolving the issue.
- O&M requests made by Golder will receive a response by email from the operator within 24 hours indicating when the request can be carried out.
- The operator will inform Golder if any pieces, parts, chemicals, sample bottles, etc. need to be ordered as soon as the need is noticed.

### 6.2 Data Communication

Large quantities of data will be generated during the course of the study. Based on Golder's experience, successful pilot operations depend in part on timely and organized data communication. In general, Golder will be responsible for entering and managing analytical and field data for the RO pilot and analytical data for the ABMet pilot treatment system. Golder will provide field data sheets for both pilot systems. Operational data for ABMet will be available from GE. General guidelines for data communications are listed below.





- Laboratory results for all pilot data should be sent to Golder (Paul Pigeon, Victor Wirick and Karen Budgell). Monsanto will also be copied on results, if requested.
- Laboratory results for ABMet and RO pilot data will be sent to GE after the results are received by Golder.
- Laboratory chain of custody (COC) forms will be emailed to Golder (Karen Budgell) within 48 hours of the samples being shipped.
- Field data sheets for ABMet and RO pilots to Golder (Victor Wirick) on a weekly frequency.
- Field data sheets for RO pilot to GE operations management on a schedule to be determined with GE.
- A weekly conference call will be held to discuss pilot operations and sampling with the operators, Golder project management and GE. Golder will provide meeting minutes via email within 48 hours of the call, unless it is decided minutes are not needed during the call.





## 7.0 HYDROGEN SULFIDE AWARENESS

The ABMet process can generate toxic hydrogen sulfide gas. Hydrogen sulfide is heavier than air and smells like rotten eggs. Upon exposure, the human nose can become desensitized and will no longer detect the odor. Hydrogen sulfide will be generated in the anaerobic bioreactor and may be present in the bioreactor effluent water and treated water downstream of the reactors. The backwash water generated by backwashing of the ABMet bioreactor may also contain sulfide.

In addition to standard site safety measures, the following measures are being taken:

- The presence of hydrogen sulfide will be detected by odor, gas monitor(s), and analysis of sulfide in water samples.
- Operators and any other personnel entering the pilot structure must wear an active personal airspace monitor (PAM). Appropriate fresh air calibration and testing should be conducted on a regular basis in accordance with manufacturer's specification. If hydrogen sulfide is detected at levels that exceed the site-designated action levels, all personnel must evacuate immediately and re-assess safety measures. The operator will continue to monitor air inside the structure from a screen on the outside of the structure, which will display hydrogen sulfide in the inside air at fixed sensors.

These recommended measures are not intended to supersede the site health and safety plan but are intended as general guidance for toxic gas awareness and control. The site health and safety plan should be referred to for more information on hydrogen sulfide. It should be noted that olfactory fatigue is almost instantaneous at the Immediately Dangerous to Life or Health (IDLH) value. Operators shall evacuate the trailer immediately if any gas monitor is in alarm state, whether or not H<sub>2</sub>S odor is detected.





## 8.0 CLOSING

Golder will utilize the information in this plan to conduct pilot operations at the Monsanto Soda Springs site. Please contact one of the undersigned with any additional questions or comments on the information presented herein.

### GOLDER ASSOCIATES INC.

Thomas L. Rutkowski, PE  
Associate/Project Manager

Paul E. Pigeon, PE  
Associate/Water Treatment Lead

Karen Budgell, EIT  
Lead Process Engineer




## FIGURES



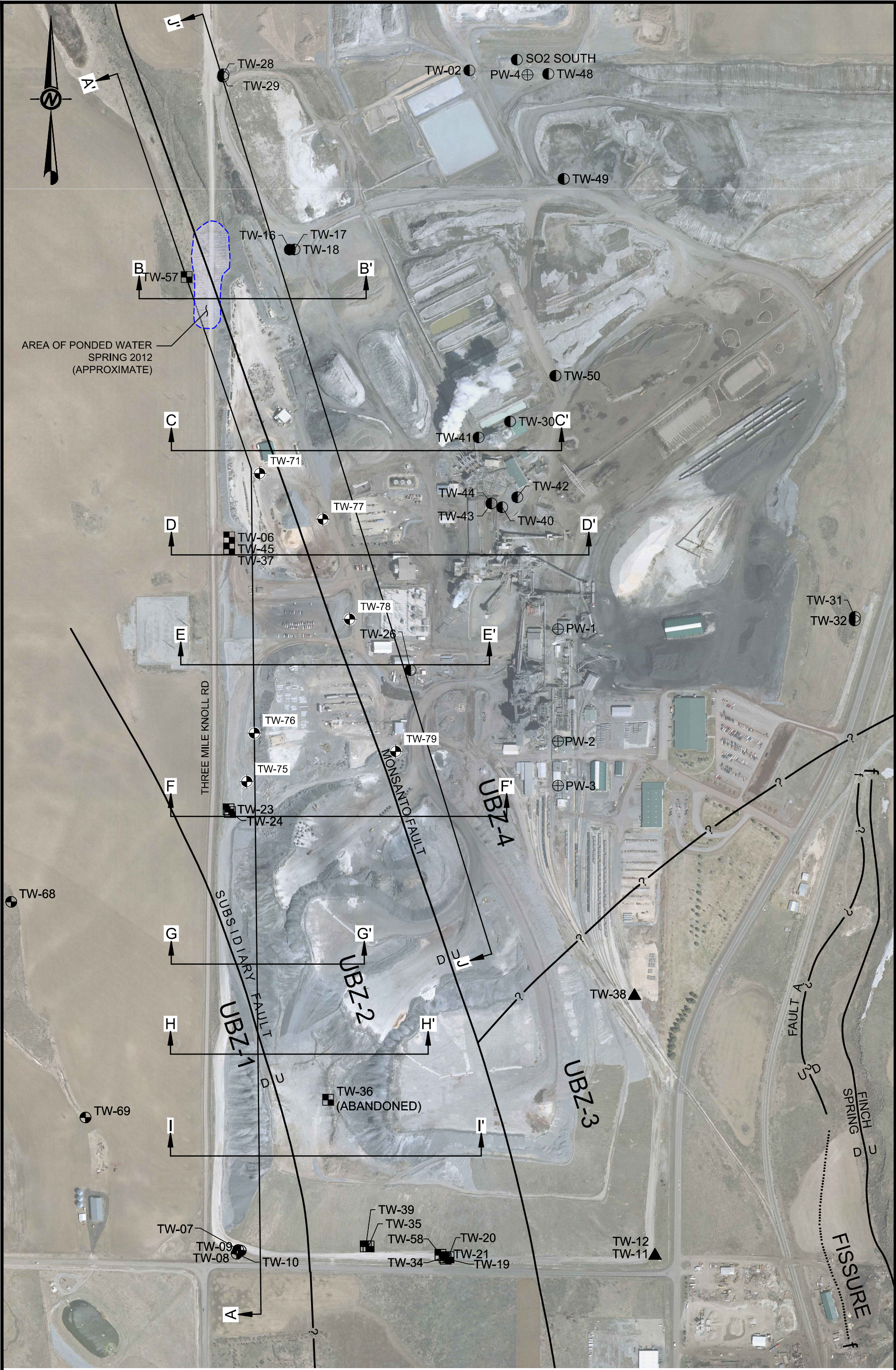
J:\09\08\09-1311\01003 Monsanto Selenium\02 Pilot Testing\01 Pilot Testing\01 - Pilot Location 24JUN2014.vsd



From TW-58

CLIENT			PROJECT		
MONSANTO SODA SPRINGS, ID			SELENIUM PILOT TESTING		
CONSULTANT			TITLE		
			PILOT TESTING LOCATION		
			PROJECT No.		
			9131101003		
			Rev		
			A		
			FIGURE		
			1		



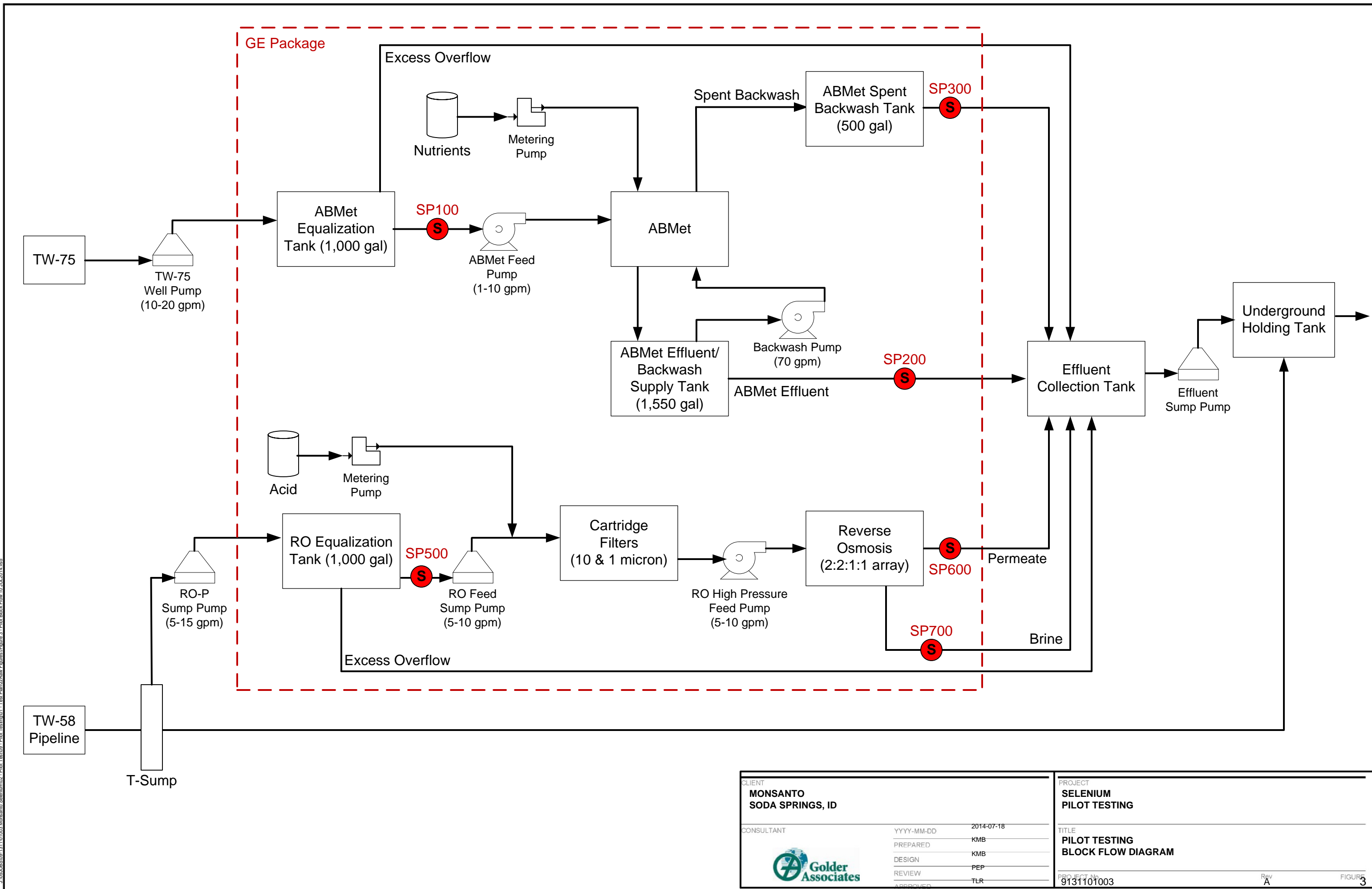


SOURCE:  
AERIAL PHOTO FROM MONSANTO (5/18/2011).




FIGURE **2**  
**UBZ-2 SOURCE AREA CHARACTERIZATION**  
**CROSS SECTION LOCATION MAP**  
Monsanto/Soda Springs 5 yr Review - Annual GW+SW Sampling/UBZ-2 Invest.





J:\08\OB\S\09-1311-01\003 Monsanto Selenium\02 - Pilot Test\09 - Pilot Test\01 - Test Plant\BFW Figures\Figure 3 - Pilot Block Flow 10 JUL2014.vsd

CLIENT MONSANTO SODA SPRINGS, ID			PROJECT SELENIUM PILOT TESTING	
CONSULTANT 	YYYY-MM-DD	2014-07-18	TITLE PILOT TESTING BLOCK FLOW DIAGRAM	PROJECT No. 9131101003
	PREPARED	KMB		
	DESIGN	KMB		
	REVIEW	PEP		
APPROVED			Rev A	FIGURE 3



**ATTACHMENT A**  
**PILOT EQUIPMENT AND STRUCTURE PROPOSALS**



## **ABMET PILOT PROPOSAL**



Proposal Prepared for:

**Monsanto**  
**Soda Springs, Idaho**

**ABMet® Technology**

**Pilot-Scale Demonstration**

**GE Proposal # PIL-746517.Rev4**

*Submitted to:*

**Golder Associates Inc.**

Attention: Victor Wirick, P.E.

44 Union Boulevard,  
Suite 300, Lakewood  
Colorado, USA, 80228

*Submitted by:*

**ZENON Environmental Corporation**

**c/o GE Water & Process Technologies**

3239 Dundas Street West

Oakville, ON L6M 4B2

**July 10, 2014**



imagination at work





## Table of Contents

<b>1</b>	<b>Confidentiality .....</b>	<b>3</b>
<b>2</b>	<b>Introduction .....</b>	<b>4</b>
<b>3</b>	<b>GE Water &amp; Process Technologies .....</b>	<b>5</b>
3.1	Company Overview .....	5
3.2	Fields of Expertise .....	5
3.3	We don't just promise value. We prove it.....	6
3.4	Global Leadership .....	7
<b>4</b>	<b>The GE ABMet® System .....</b>	<b>8</b>
<b>5</b>	<b>ABMet® Treatment Process .....</b>	<b>9</b>
<b>6</b>	<b>Reverse Osmosis Technology .....</b>	<b>11</b>
<b>7</b>	<b>Pilot Study Design Basis .....</b>	<b>13</b>
<b>8</b>	<b>Pilot Study Objectives .....</b>	<b>15</b>
8.1	Preliminary Analytical Testing Plan .....	15
<b>9</b>	<b>The ABMet® Pilot Equipment.....</b>	<b>17</b>
<b>10</b>	<b>Reverse Osmosis and Pretreatment Pilot Equipment.....</b>	<b>18</b>
10.1	Reverse Osmosis Pilot .....	18
<b>11</b>	<b>Pilot Study Schedule .....</b>	<b>20</b>
<b>12</b>	<b>ABMet Pilot Installation &amp; Start-Up Requirements.....</b>	<b>21</b>
<b>13</b>	<b>Pre-Commissioning Checklist.....</b>	<b>23</b>
<b>14</b>	<b>Commercial Offer.....</b>	<b>24</b>
14.1	Pricing Table .....	24
14.2	Validity.....	24
14.3	Invoicing and Payment Terms.....	24
14.4	Equipment Shipment and Delivery.....	25
14.5	Pricing Notes .....	25
14.6	Conditional Offering .....	25
<b>15</b>	<b>Scope of Supply Requirements .....</b>	<b>26</b>
15.1	GE W&PT Scope of Supply .....	26
15.2	Client / Customer Scope of Supply .....	27
<b>Appendix A. Pilot Rental Agreement .....</b>		<b>30</b>
<b>Appendix B. ABMet Pilot Equipment Drawings .....</b>		<b>31</b>





# 1 Confidentiality

The observations, determinations, formulation information of GE Water & Process Technologies products, and recommendations presented in this proposal are the work product of GE W&PT and its affiliates (collectively referred to hereinafter as "Confidential Information"), and are provided solely with the understanding and CLIENT agreement that the information contained in this document is submitted for evaluation by CLIENT only. CLIENT agrees not to reveal its contents except to those in Client's/Customer's organization necessary for evaluation. Copies of this document may not be made without the prior written consent of GE W&PT. If the preceding is not acceptable to CLIENT, this document shall be returned to GE W&PT.





## 2 Introduction

GE Water & Process Technologies (GE W&PT) is pleased to submit this pilot proposal to supply one (1) ABMet® Pilot-Scale System and the option for one (1) Reverse Osmosis Pilot-Scale System. This document provides an introduction to the ABMet® pilot equipment and Reverse Osmosis pilot equipment, which is used to demonstrate ABMet® and Reverse Osmosis capabilities at a smaller scale. A pilot rental agreement for the Monsanto Mine pilot study is included in Appendix A.





## 3 GE Water & Process Technologies

### 3.1 Company Overview

GE Water & Process Technologies is a leading global solutions provider of water, wastewater, desalination and process systems. GE delivers customer value by improving performance and product quality, by reducing operating costs and by extending equipment life. A broad range of products and services are used to optimize total water/process system performance, safeguard customer assets from corrosion, fouling and scaling, and protect the environment through water and energy conservation. With over 2,500 field engineers bringing onsite expertise, we are able to deliver value by solving our customers' most challenging problems and improving the bottom line.

Headquartered in Trevose, Pennsylvania, Water & Process Technologies employs almost 8,000 people worldwide. Global Centers of Excellence conduct leading edge research in our fields of expertise. Sites include Minnetonka, Minnesota; Burlington, Massachusetts; Norfolk, Virginia; The Woodlands, Texas; Guelph, Ontario; Oakville, Ontario; Heverlee, Belgium; Munich, Germany; San Pablo, Brazil; and the GE Global Research Centers in Niskayuna, New York; Bangalore, India; and Shanghai, China.



### 3.2 Fields of Expertise

GE is unique in the industry, bringing a full array of products and service offerings to our customers. Our core competencies include:

- ❑ Reverse Osmosis, Nanofiltration, Ultrafiltration and Microfiltration membrane systems for removing suspended and dissolved solids from fresh water, waste water and sea water
- ❑ Electrodionization (EDI) for producing ultrapure water without chemical regenerants
- ❑ Electrodialysis reversal (EDR), widely used to treat water supplies which are challenging for other technologies to process and where water recovery up to 95% is required
- ❑ Mobile water treatment solutions for short-term and emergency use including deionization, filtration, Reverse Osmosis and EDI trailers in the industry's largest fleet
- ❑ Service agreements to Design, Build, Own, Operate and Maintain water treatment systems, allowing customers to focus their resources on their key operations
- ❑ Water treatment chemicals and application engineering for raw and wastewater clarification, process water and industrial boiler and cooling water
- ❑ Process chemicals and additives for improved performance in refining, pulp & paper and metals processing applications







GE Water and Process Technologies' presence in North America is complimented by a strong global team. Below is a short list describing some highlights of GE Water & Process Technologies' global presence:

- ☐ 7,650 employees in over 70 countries
- ☐ 4,000 degreed technical field service reps
- ☐ 40 manufacturing facilities – 1 Pilot production plant (TX)
- ☐ 4 Global R & D facilities (New York, India, Germany, China)
- ☐ 4 Customer support labs in (Pennsylvania, Texas, Belgium, China)
- ☐ 9,000 sq. ft. pilot facility in Trevose, Pennsylvania
- ☐ 600 mobile water and wastewater treatment trailers in the field

### 3.3 We don't just promise value. We prove it.

With GE, you know precisely how our water and process technologies help your bottom line. A Value Generation Plan quantifies how we enhance your key business results. To create a Value Generation Plan, we discuss your strategic objectives and suggest projects that can help you meet them. Then we monitor and manage all projects and report in detail how each one helped to:

- ☐ Improve productivity
- ☐ Optimize critical equipment life and performance
- ☐ Increase process uptime
- ☐ Drive out costs
- ☐ Reduce waste
- ☐ Improve regulatory compliance
- ☐ Ensure performance through continuous monitoring and preventative diagnostics
- ☐ Preserve your capital and protect your cash flow with flexible financing







### 3.4 Global Leadership

A comprehensive portfolio, innovative technology, application expertise and personal service are what made GE Water & Process Technologies a leader in water and process treatment. A passion for solving the world's most challenging water and process problems, being environmentally responsible and most importantly, ***helping our customers win*** guides our roadmap for the future.

Part of that future is ecomagination, ([www.ecomagination.com](http://www.ecomagination.com)) an aggressive, long-term initiative from GE to bring to market new technologies that address the world's biggest environmental challenges. As part of ecomagination, GE pledges to double its investment in cleaner technologies, introduce more products that provide significant environmental performance advantages to customers, and offer more products and services that help customers meet their pure water and wastewater demands, reduce greenhouse gas emissions and improve efficiency.





### 4 The GE ABMet® System

The GE ABMet® system is built around an advanced anoxic/anaerobic biological wastewater treatment process that uses naturally occurring non-toxic, non-pathogenic microbes in specially developed mixtures, which reduce and precipitate target compounds from solution, or convert target compounds into their insoluble chemical components.

The ABMet® process consists of a bio-filter containing a bio-matrix for microbial growth. Activated carbon is used as a media on which selected microorganisms will grow and be retained within the system. Activated carbon is employed due to the very large surface area available for microbial growth. Moreover, much of the surface area is protected in crevices within each carbon particle, thus sheltering biomass from shear and abrasive forces.

Microbial cultures and nutrient blends are optimized for each site specific water chemistry and treatment context. The efficiency and effectiveness of the ABMet® system is based on four key components:

- Site-optimized microbial cultures
- Site-optimized nutrient blends
- Process-optimized matrix for bio-film growth and stability
- Solid engineering for trouble free operation

Wastewater flows downward through the bio-matrix, contacting the microbial mixtures at a specified rate and at a specific empty-bed contact time, and ensuring that a reducing environment is maintained. Reduced contaminants are retained within the bio-matrix until they are flushed out for recovery.

The ABMet® system has been proven effective for the removal of metals, metalloids, nonmetals and inorganic compounds such as nitrate. Selenate and selenite complexes can be successfully removed. Simple system designs make the ABMet® system very inexpensive to operate and maintain over the long term.





### 5 ABMet® Treatment Process

The ABMet® process is a GE technology that uses biofilters containing naturally occurring, non-toxic and non-pathogenic microbial cultures to treat wastewater streams containing a wide range of contaminants including selenium. The ABMet® pilot system includes one (1) biofilter operated with feed water entering the top and effluent exiting at the bottom. The biofilter contains a mixture of microbes and the granular carbon on which the microbes reside.

Feed water is supplied at a consistent flow rate that is greater than the pilot feed flow. Therefore, an overflow stream will need to be diverted to a below grade drain. Once raw or pre-treated feed water is delivered to the pilot system, the biofilter is fed via a feed pump.

The feed pump delivers the raw wastewater to the top of the biofilter. It flows downward through the biofilter and is collected in a distribution system at the bottom. The feed and collection distribution systems ensure even flow across the cross sectional area of the biofilter, and are designed for a flow rate of 1-10 gpm.

The effluent flows from the biofilter by gravity to the backwash storage tank and is then gravity flows to a suitable discharge location.

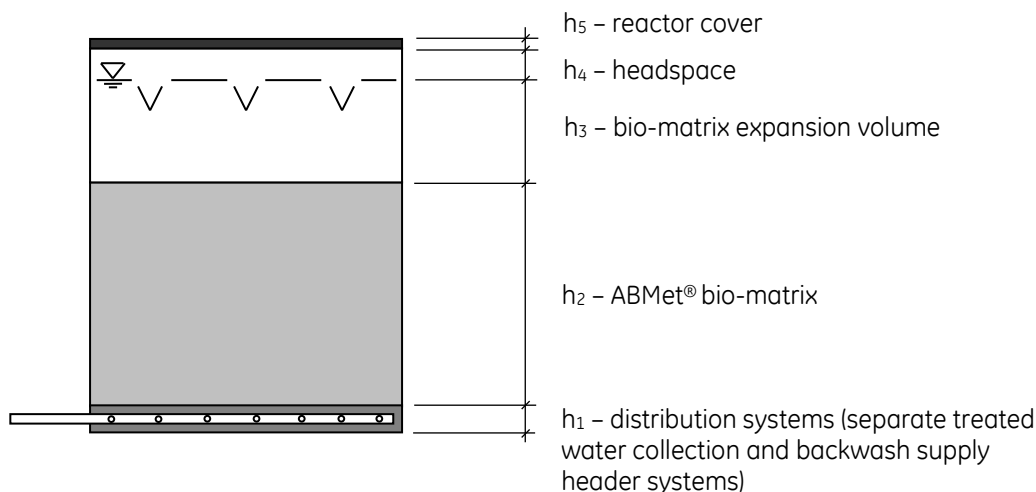
Instrumentation is included to monitor the following parameters:

- a) Feed temperature
- b) Feed pH
- c) Feed redox potential (ORP)
- d) Biofilter influent turbidity
- e) Feed flow rate
- f) Tank levels (including biofilter)
- g) Biofilter effluent pH
- h) Biofilter effluent redox potential (ORP)
- i) Biofilter effluent turbidity
- j) Nutrient flow rate

The level of the biofilter is monitored to determine when degassing and backwashing is required. In the event of a severe spike in feed water turbidity/suspended solids, consideration should be given to temporarily stopping system operation to prevent high levels of suspended solids in the feed stream from causing increased backwashing frequency of the biofilter. Determination of the impact of any activities in the feed will likely only be feasible once the system is in operation.

Figure 1 below illustrates a typical cross-section of an ABMet® biofilter. The feed distribution system at the top of the biofilter is not shown for clarity. For the same reasons, only one distribution system is shown at the bottom of the biofilter.





**Figure 1 – ABMet® biofilter cross-section**

Nutrient is added automatically to the biofilter to provide sufficient nourishment for the microbes in the biofilter since the feed water solution does not contain sufficient nutrients. An automated nutrient pump will dose the correct amount of nutrient directly to the feed water. A nutrient pumping system and storage tank are included.

Periodically the biofilter must be degassed to allow for the removal of built-up gasses in the carbon beds as a result of the biological activity. Degassing is a short (~30 seconds) backwash of the bed, in order to “bump” the bed to allow for the removal of entrained gas. When the degas sequence does not recover the head loss across the bed, the process will need to be flushed, to allow the release of accumulated solids. Backwashing is accomplished using the backwash storage water supply. The backwash flow rate is much larger than the normal operating flow, in order to fluidize the carbon bed and carry solids out of the biofilter. To ensure adequate flow distribution during this procedure, a separate header/lateral distribution piping system is provided and located at the bottom of the biofilter. The degas system is designed to operate automatically or manually depending on the degas frequency. Backwashing is done manually.

Depending upon environmental conditions and microbial activity levels, there is a potential for the generation and buildup of hydrogen sulfide (H<sub>2</sub>S) gas when the biofilters are shut down or are off-line for a period of time. The pilot unit is equipped with ventilation fan and H<sub>2</sub>S alarm to protect operators inside the pilot unit. H<sub>2</sub>S exposure should be considered in locating the pilot unit to protect operators and visitors from exposure to an unhealthy buildup of the H<sub>2</sub>S gas in the vicinity of the pilot, and effluent drain location

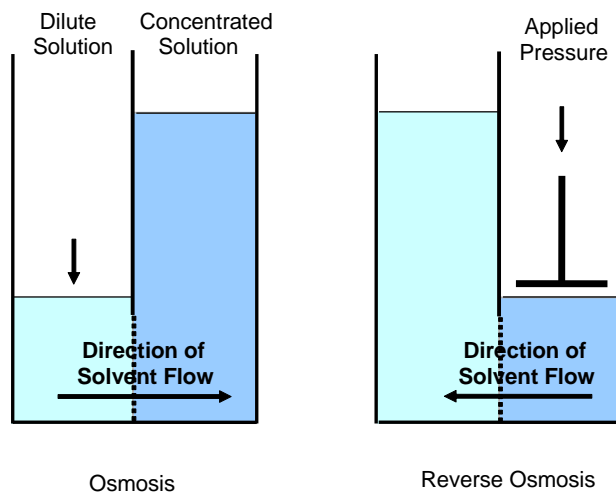




## 6 Reverse Osmosis Technology

Osmosis is a natural process in which a solvent (water) passes through a semi-permeable membrane from the lower to the higher solute concentration, until the concentrations on either side of the membrane are equal.

The process of Reverse Osmosis (RO) is the engineered application of this principal to achieve water purification by the application of external pressure to the more concentrated solution. This results in a reversal of solvent (water) flow towards the region of lower solute concentration, thereby purifying one side while concentrating the other. Schematic representations of the processes of osmosis and reverse osmosis are presented in Figure 2, below.



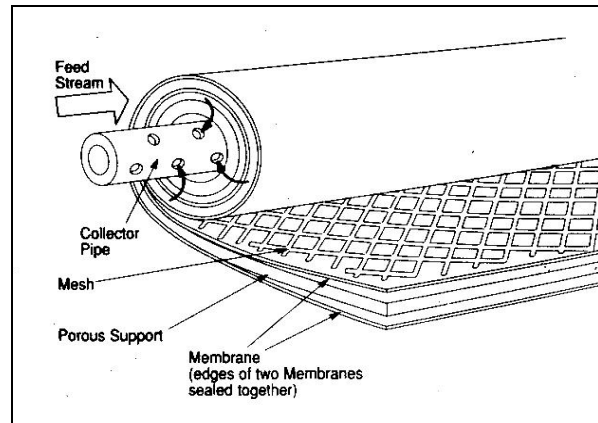
**Figure 2 - Schematic Representation of Osmosis and Reverse Osmosis**

Reverse osmosis membranes will reject dissolved salts and metal ions, as well as organic compounds and bacteria. The degree to which a particular substance is rejected by the membrane depends on the type of membrane used, and the resulting difference between the liquid transport characteristics of the RO membrane and the solute transport characteristics of the membrane. The final effluent quality from a Reverse Osmosis system is the result of the unique combination of these factors. In general, the salt passage is inversely related to pressure (i.e. salt passage increases as applied pressure decreases). The reduced pressure causes a decrease in permeate flow since permeation is directly proportional to applied pressure.





RO Membranes are configured into a spiral-wound module configuration (Figure 3) where multiple membrane sheets are wrapped around a central permeate collector tube. Each membrane sheet is in fact a sandwich, with two separate membrane sheets each with the membrane layer facing outwards, commonly separated from each other with a thin material.



**Figure 3 - Spiral Wound Membrane Configuration**

The sandwich is glued on three sides, leaving the fourth side to be eventually connected to the permeate collector tube. Each membrane sheet sandwich is then separated from other individual sandwich sheets by means of a loosely woven plastic material that is inserted to keep the sheets from each other while also promoting turbulent flow conditions. Multiple layers of these sheets and spacers are centrally connected about the permeate collector tube (the tube is drilled to allow permeate to pass into the tube), and are then wrapped tightly about each other in one direction causing the sheets to spiral away from the center tube. The spiral configuration membrane gets its name from this pattern. Water to be treated is pumped through this spiral bundle, where the feed and concentrate flows are parallel to the membrane surface. The feed flows into the mesh layer and the permeate flows into the porous support which leads to the central collector pipe.

As water is pumped along the membrane surface length, and permeate is continually being extracted from the main feed water supply, the residual concentrate volume is decreasing. As the volume decreases along the membrane length, concentration factors associated with the dissolved constituents must be taken into consideration in the full-scale design. In addition, the effects of salt concentration and its effects on increasing salt passage must also be taken into account in the full-scale design. Finally, the immense benefit of the spiral configuration is the packing density of membrane area within a relatively small pressure vessel.





## 7 Pilot Study Design Basis

Monsanto Mine is investigating options for selenium removal. The table below presents a summary of the feed water quality provided. The ABMet and RO pilots will be set up to treat the feed water separately. The RO will treat TW-58 and the ABMet will treat TW-75.

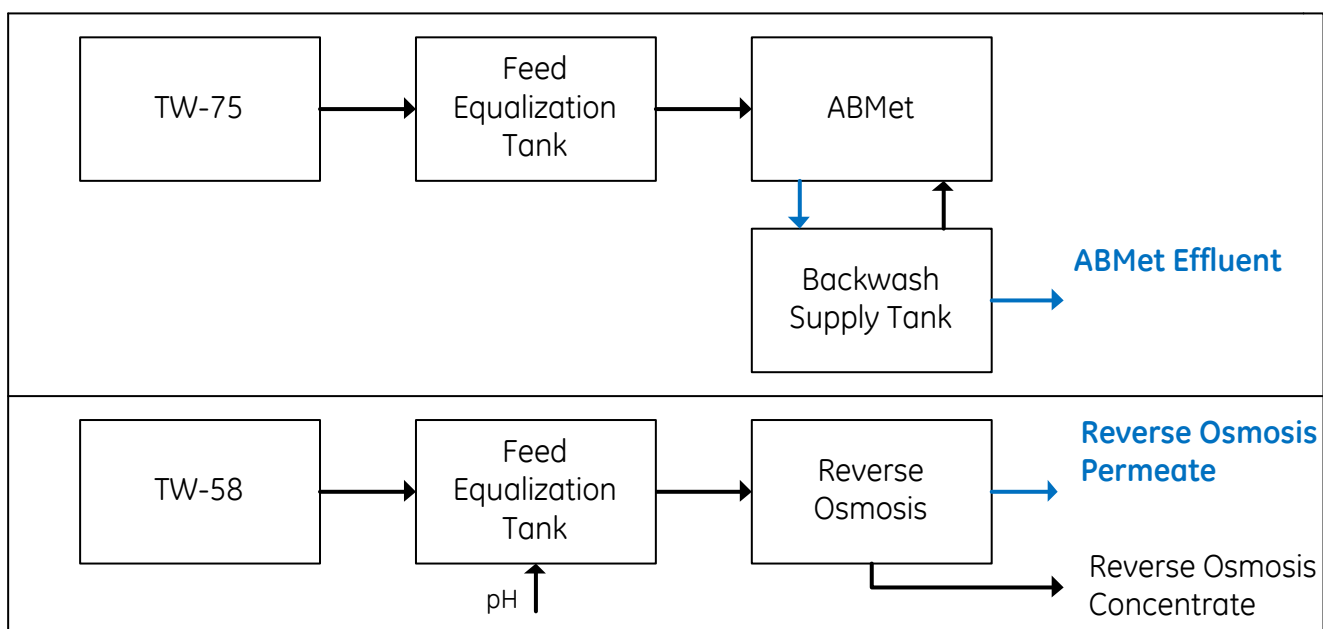


Table 1: Pilot Design Data

Location	TW-58					TW-75				
Parameters	Min	Max	Avg.	No. of Samples	2013/2014 Average	Min	Max	Avg.	No. of Samples	2013/2014 Average
Alkalinity, total (mg/L as CaCO <sub>3</sub> )	356	397	364	7	397	581	581	581	1	581
Ammonia (mg/L as N)	0.033	0.450	0.198	7	0.03	1.05	1.05	1.05	1	1.05
Cadmium, total (µg/L)	8	19	15	7	7.6	131	131	131	1	131
Calcium, total (mg/L)	131	184	164	7	175	168	168	168	1	168
Chloride (mg/L)	95.6	171	155	7	95.6	89.1	89.1	89.1	1	89.1
Copper, total (mg/L)	-	-	-	0	-	-	-	-	0	-
Fluoride (mg/L)	2.00	6.25	5.40	7	2.00	3.45	3.45	3.45	1	3.45
Hardness (mg/L as CaCO <sub>3</sub> )	892	892	892	1	892	890	890	890	1	890
Lead, total (mg/L)	-	-	-	0	-	-	-	-	0	-
Magnesium, total (mg/L)	85.2	119	106	7	110	114	114	114	1	114





Manganese, total (mg/L)	0.001	0.012	0.004	7	0.001	0.595	0.595	0.595	1	0.595
Molybdenum, total (mg/L)	0.041	0.114	0.097	7	0.041	0.393	0.393	0.393	1	0.393
Nickel, total (mg/L)	0.0264	0.0308	0.0284	6	-	-	-	-	0	-
Nitrate plus Nitrite (mg/L as N)	7.6	10.5	8.8	7	10.5	7.2	7.2	7.2	1	7.2
Nitrate (mg/L as N)	-	-	-	0	-	-	-	-	0	-
Nitrite (mg/L as N)	0.02	0.02	0.02	6	-	-	-	-	0	-
pH (s.u.)	6.7	6.8	6.7	9	-	-	-	-	0	-
Phosphorus, total (mg/L)	0.184	0.184	0.184	1	0.184	0.718	0.718	0.718	1	0.718
Potassium, total (mg/L)	2.10	16.5	4.32	7	16.5	30.6	30.6	30.6	1	30.6
Selenium, total (mg/L)	134	593	487	7	134	403	423	413	2	423
Selenium, dissolved (mg/L)	-	-	-	0	-	-	-	-	0	-
Selenate, total (µg/L)	-	-	-	0	-	331	331	331	1	331.0
Selenite, total (µg/L)	-	-	-	0	-	45	45	45	1	44.6
Sodium, total (µg/L)	73.2	109	93.4	7	73.2	73	73	73	1	73
Sulfate (mg/L)	439	508	482	7	439	374	374	374	0	374
Total Dissolved Solids (mg/L)	1,300	1,488	1,448	7	1,300	1,150	1,150	1,150	1	1,150
Vanadium, total (mg/L)	0.006	0.014	0.012	7	0.006	0.015	0.015	0.015	1	0.015
Zinc, total (mg/L)	0.069	0.246	0.203	7	0.069	0.924	0.924	0.924	1	0.924

If the data does not accurately reflect the current well water quality GE W&PT requests that the CLIENT provide updated data. All information in this proposal document is subject change if the water quality parameters vary greatly from those above. GE W&PT reserves the right to make changes to the schedule, equipment recommendations and pilot cost based on the review of the expected water quality.





## 8 Pilot Study Objectives

- ☐ Determine the effectiveness of:
  - i. GE's ABMet® system in removing Selenium (Se) to less than 5.0 µg/L while treating feed water from TW-75.
  - ii. Piloting a single pass Reverse Osmosis to remove Selenium (Se) to less than 5.0 µg/L while treating feed water from TW-58.
- ☐ Determine and optimize ABMet® operating parameters such as backwash and de-gassing frequencies, hydraulic retention time, and nutrient dosage for a full-scale system.
- ☐ Determine the optimum Reverse Osmosis design parameters that will generate stable performance.
- ☐ Demonstrate effective Reverse Osmosis cleaning regimes, including type of chemicals and minimum time between cleaning.
- ☐ Provide hands-on training for the Owner's plant operators.
- ☐ Develop budgetary full-scale estimate.

If Monsanto Mine has additional pilot study objectives these should be discussed prior to the beginning of the pilot study.

### 8.1 Preliminary Analytical Testing Plan

During the RO pilot study, samples will be taken of the feed, concentrate and permeate streams to characterize the performance of the RO pilot system. Sample collection will be performed by Golder and Monsanto Mines. Table 2 summarizes the sampling schedule and constituents for analysis.

**Table 2: Sample RO Analytical Testing Plan**

Parameter to be testing on all streams (feed, concentrate, permeate)	Frequency	Units
pH	7/week	Std. Unit
Specific Conductance	7/week	uS/cm
Total Selenium	3/week	µg/L
Dissolved Selenium	3/week	µg/L
Alkalinity, "P" as CaCO <sub>3</sub>	3/week	mg/L
Alkalinity, "M" as CaCO <sub>3</sub>	3/week	mg/L
Sulfur, total	3/week	mg/L
Chloride, as Cl	3/week	mg/L
Hardness, total as CaCO <sub>3</sub>	3/week	mg/L
Calcium Hardness, total as CaCO <sub>3</sub>	3/week	mg/L
Magnesium Hardness, total, as CaCO <sub>3</sub>	3/week	mg/L
Barium, total	3/week	mg/L





Strontium, total	3/week	mg/L
Copper, total as Cu	3/week	mg/L
Iron, total	3/week	mg/L
Sodium, as Na	3/week	mg/L
Potassium, as K	3/week	mg/L
Aluminum, total as Al	3/week	mg/L
Manganese, total	3/week	mg/L
Nitrate, as NO <sub>3</sub>	3/week	mg/L
Phosphate, total as PO <sub>4</sub>	3/week	mg/L
Phosphate, ortho- as PO <sub>4</sub>	3/week	mg/L
Silica, total as SiO <sub>2</sub>	3/week	mg/L
Fluoride, as F	3/week	mg/L
Carbon, total organic	3/week	mg/L
Turbidity	7/week	NTU

During the ABMet pilot study, samples will be taken of the feed and effluent streams to characterize the performance of the pilot system. Sample collection will be performed by Golder and Monsanto Mines. Table 3 summarizes the sampling schedule and constituents for analysis. Additional samples of the ABMet back wash waste may also be requested during the piloting after a backwash is completed. Additional sample requests shall be agreed upon by the team before they are collected.

**Table 3: Sample ABMet Analytical Testing Plan**

Parameters to be tested on all streams (feed and permeate)	Frequency	Units
Total Selenium	3/week	µg/L
Dissolved Selenium	3/week	µg/L
Total Suspended Solids	3/week	mg/L
Total Dissolved Solids	3/week	mg/L
BOD <sub>5</sub>	3/week	mg/L
COD	3/week	mg/L
TOC	3/week	mg/L
Nitrate as N	3/week	mg/L
Nitrite as N	3/week	mg/L
Sulphate	3/week	mg/L
Sulphide	3/week	mg/L
Calcium	3/week	mg/L
Ortho Phosphate	3/week	mg/L
Alkalinity	3/week	mg/L
Full selenium speciation	1/month	µg/L





## 9 The ABMet® Pilot Equipment

The ABMet® pilot is a scaled-down version of a full-scale water treatment plant, used to demonstrate treated water quality and to collect operational data for full-scale design. It is automated with all the necessary components to perform operating procedures used by full-scale ABMet® treatment plants. The demonstration system consists of a skid based pilot unit containing all ancillary equipment. Refer to the subsequent tables for detailed pilot specifications. General arrangement drawings and the P&ID can be found in Appendix B.

### ABMet® Skid Components

- ☐ One (1) Ø 36" X 192" bioreactor vessel with feed and back wash distribution system
- ☐ One (1) 1 to 10 gpm feed pump
- ☐ One (1) 25 to 100 gpm backwash pump
- ☐ One (1) variable speed nutrient pump
- ☐ Process valves and instrumentation
- ☐ Control system with mobile broadband access

### External Components

- ☐ One (1) Ø 87" X 67" 1550 gallon backwash supply water storage tank
- ☐ One (1) 36" X 46" X 46" nutrient storage tote
- ☐ One (1) 1000 gallon feed break tank. To be purchased locally in Soda Springs, Idaho by GE. If a local supplier cannot supply the required 1000 gallon feed break tank, GE will purchase and ship the 1000 gallon feed break tank with the bulk of the equipment. GE will submit a change order for the cost of the tank and shipping.
- ☐ One (1) submersible feed pump. 120 VAC, 20A, single phase.

### Other Weights

- ☐ Backwash tank 300 lbs
- ☐ Nutrient tote 500
- ☐ Crate 300 lbs
- ☐ Carbon bags 1600 lbs
- ☐ 250 gallon tank 150 lbs

### System Dimensions

	Width	Length	Height	Weight
<b>Pilot Skid</b>	47 ¾" (1.2 m)	75" (2 m)	196 1/8 " (5 m)	2,500 lbs. (1134 kg)

### Electrical (main service)

208/240 V, 40 Amp

### System Tie-Points

Tie-Point	Dimension
Raw Water Feed Inlet	1" PVC MPT
Backwash Supply	2" PVC MPT
Backwash Effluent	3" PVC MPT
Effluent	2" PVC MPT

### System Process Streams for all modes of Operation

Stream	Typical Flow Rates	Characteristics
Raw Feed	1 – 10 gpm (3.8 – 38 Lpm)	Flooded Suction on Feed Pump
Backwash Supply	70 gpm (265 Lpm)	Flooded Suction on Feed Pump
Backwash Effluent	70 gpm (265 Lpm)	Dispose to gravity drain





Effluent	1 – 10 gpm (3.8 – 38 Lpm)	Dispose to gravity drain
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## 10 Reverse Osmosis and Pretreatment Pilot Equipment

### 10.1 Reverse Osmosis Pilot

A reverse osmosis pilot (Figure 5), uses six 4" reverse osmosis modules housed in 6 vessels. The system is set up in a 2:2:1:1 array and is run at different recoveries and flux rates throughout the pilot study to effectively model the full-scale design.

The RO pilot system comes equipped with all of the necessary components required for safe, reliable and continuous operation. It can be operated to a maximum temperature of 30°C (85°F) and a maximum pressure of 400 psig. The system is constructed of corrosion resistant materials designed to process fluids ranging in pH from 2 to 12. Refer to the subsequent tables for detailed RO pilot specifications.



Figure 5 – Reverse Osmosis Pilot





## RO Pilot Skid Components

1-micron pre-filter	Automatic inlet shut-off valve
Permeate and Concentrate flow meters	Thermal motor protection
Pre-filter, post-filter, primary and final pressure gauges	Flow control center, including concentrate and recycle valves
Auto flush system	Low inlet pressure switch
Digital conductivity meter	Low inlet pressure and motor starter overload alarms
<b>External Components</b>	

## External Components

1 x 1000 gallon feed break tank**	1 x submersible feed pump (120VAC, 20A, Single Phase)
1 x pH control system (dosing pump, 60 L day tank, pH probe)	
**To be purchased locally in Soda Springs Idaho by GE. If a local supplier cannot supply the required 1000 gallon feed break tank, GE will purchase and ship the 1000 gallon feed break tank with the bulk of the equipment. GE will submit a change order for the cost of the tank and shipping.	

## Typical Operating Parameters

Operating Pressure	220 psig (15 bar)
Maximum Recovery	75%
Nominal Rejection	95 – 98%
Operating Temperature	55 – 85°F (13 – 30°C)
Minimum Inlet Pressure	30 psig (2 bar)

## System Dimensions

Skid	Width	Depth	Height	Weight
Pilot	27" (68 cm)	28" (71 cm)	65" (165 cm)	345 lbs (156 kg)

\*shipping dimensions

## Electrical (main service)

480V, 60 Hz, Three Phase, 30 A
--------------------------------

## System Tie-Points

Tie-Point	Dimension
Feed Inlet	0.75" (1.9 cm)
Permeate Discharge Outlet	0.75" (1.9 cm)
Concentrate Outlet	0.75" (1.9 cm)

## Flow Specifications

Parameter	Typical Range
Recovery	50 – 75%
Permeate Rate	9.0 gpm (2.1 m <sup>3</sup> /h)
Concentrate Rate	3.0 – 9.0 gpm (0.7 – 2.1 m <sup>3</sup> /h)

\* Permeate flow rate dependent on water quality





## 11 Pilot Study Schedule

Time Period	Task
Weeks Prior	<b>Pilot Study Preparation</b> <ul style="list-style-type: none"><li>GE W&amp;PT &amp; Client collaborates to prepare the pilot equipment, the pilot site, and a study work plan. An analytical schedule will be proposed.</li><li>The pilots are shipped to site.</li></ul>
First Day	<b>Pilot Equipment Arrives at Site</b> <ul style="list-style-type: none"><li>The Client receives the pilots, unloads and places them in the location designated for the pilot study. The Client will supervise these activities.</li></ul>
First Week	<b>Pilot Installation</b> <ul style="list-style-type: none"><li>The Client connects power and plumbing to the tie-in points. Power and water must be supplied and tested by the Client before the pilot is commissioned by GE W&amp;PT.</li></ul>
Second Week	<b>Pilot Seeding, Commissioning &amp; Op Training</b> <ul style="list-style-type: none"><li>The GE W&amp;PT representative visits site to test the pilot equipment and complete ABMet® seeding with the bacteria culture.</li><li>The GE W&amp;PT representative will install the RO membranes and complete the commissioning.</li><li>Operator Training begins once GE W&amp;PT rep confirms that pilot equipment is functioning properly. Training includes an introduction to ABMet® and RO technology and demonstration of pilot equipment operation and required daily maintenance.</li><li>GE W&amp;PT begins sending out weekly update reports on system performance, operations, outlook and schedule.</li></ul>
Interim Weeks	<b>Pilot Evaluation Study</b> <ul style="list-style-type: none"><li>Client provides daily on-site operation of the pilot equipment.</li><li>GE W&amp;PT offers support by phone &amp; e-mail to assist with day-to-day project requirements.</li></ul>
Final Week	<b>Pilot Media Removal &amp; Decommissioning</b> <ul style="list-style-type: none"><li>Activated carbon media is removed from the ABMet® for return shipment by the Client.</li><li>The RO and ABMet® are decommissioned and prepared for return shipment.</li><li>The GE W&amp;PT representative will be onsite to oversee the decommissioning and secure the equipment for return shipment.</li></ul>
Final Day	<b>Pilot Equipment Leaves Site</b> <ul style="list-style-type: none"><li>The Client loads pilot equipment.</li></ul>
Subsequent Month	<b>Final Reporting</b> <ul style="list-style-type: none"><li>GE W&amp;PT provides a report of the pilot study results.</li></ul>





## 12 ABMet Pilot Installation & Start-Up Requirements

### 12.1 Purpose

The purpose of this document is to outline the requirements for the installation and commissioning of the ABMet® pilot system. The furnishing of all material and labor, listed in this document is the responsibility of the CLIENT and should be reviewed in conjunction with the pilot proposal document unless alternative arrangements have been made and are agreed upon by all applicable parties.

The Pre-Commissioning checklist included in this document must be completed prior to the arrival of GE W&PT commissioning personnel to the pilot site. It is requested that the document be filled out, signed and returned no later than 72 hour prior to the scheduled commissioning visit. In cases where items are going to be completed after this date, the expected completion date should be noted. Failure to adequately complete the tasks listed prior to the arrival of GE W&PT personnel for pilot system start-up may result in additional commissioning time and additional costs to the CLIENT as a result of additional travel and personnel costs.

### 12.2 Pilot Unit Interface Requirements

The unit requires several items in order to operate properly as listed below:

☐ Power:

- a. 208/240VAC, 3-Phase, 60 amp
- b. Grounding
- c. The power/panel grounding tie-point to the container is a single, 2" NPT conduit connection.

☐ Feed Water:

- a. 1-10 USGPM constant feed source.
- b. Minimum pressure = 10 PSIG
- c. Maximum pressure = 50 PSIG
- d. Maximum temperature = 100°F (38°C).
- e. The feed water tie-point = 1" Flange
- f. The pilot system will require continuous feed source up to 10 gpm. The pilot is designed so that excess feed water will drain to the 2" Sample Waste Effluent tie-in. This tie-in point must be connected to a drain below grade that is capable of handling continuous flow of 1 to 10 gpm.

☐ Backwash Effluent

- a. Backwash Effluent exits the pilot unit from the 4" Process Waste tie-in.
- b. Backwash Effluent flow rate is 70 gpm during backwash and degas events.





- c. The Process Waste tie-in point must be connected to a drain that is capable of handling continuous flow of 1-10 gpm during normal operation, and 70 gpm during backwash and degas events.
- ❑ Effluent Connection
  - a. Treated effluent from the pilot unit leaves the Backwash Storage Tank via a 2" Overflow tie-in.
  - b. Effluent from this tank will flow via gravity at a rate equal to the feed rate (1-10 gpm). The 2" Overflow tie-in point must be connected to a drain below grade that is capable of handling continuous flow of 1-10 gpm during normal operation.

### 12.3 Pilot Unit Installation Requirements

- ❑ The pilot unit must be level to operate properly, and requires either a gravel bed, concrete pad (maximum slope ½" over 40') or a similar suitable resting place e.g. asphalt.
- ❑ The pilot unit will require a crane or forklift with 23,000 lb. capacity for off-loading and placement.
- ❑ Power, drain, and feed water needs to be identified and available, prior to pilot shipment. Materials and labor for the connection need to be available to facilitate power hook-up to the unit prior to unit arrival. All tie-in points to/from the skid need to be connected and flushed of debris and leak tested prior to commissioning.
- ❑ The pilot system will require a drain below grade that must be capable of handling continuous flow of 1 to 10 gpm. During backwash events, the discharge flow rate will be 75 gpm max flow rate. If a sufficient drain is not available, a 1,500 gallon (minimum) backwash collection tank can be added to the site **by the CLIENT** in order to hold the backwash effluent, and allow discharge at a reduced flow rate.
- ❑ Applications where there is a likely occurrence of interconnecting piping freezing should have preventative measures taken to ensure continuous operation. In extreme cases, supplementary heating may be required for the container.
- ❑ A dedicated, non-firewalled, high-speed internet connection with dedicated, static IP addresses should be provided to allow for remote access to the PLC and troubleshooting. Alternatively, satellite/cellular connections are a suitable alternative and will be coordinated between GE W&PT and CLIENT.
- ❑ A certified electrician and a mechanical laborer need to be available on-site during commissioning.
- ❑ Operators should be available during the commissioning phase for instruction and training by GE W&PT personnel.





## 13 Pre-Commissioning Checklist

The Pre-Commissioning Checklist for the Pilot Unit including site preparation is to be completed and signed off as follows:

Item	Completed/Available
Equipment location prepared. Concrete pad or gravel bed leveled to a maximum slope of ½" per 40 feet.	
Feed water line connected, and water available.	
Cooling water connected and water available (if applicable).	
Dilution water supply connected and water available (if applicable).	
Backwash Supply Water connected and water available.	
Spent Backwash line connected.	
Sample Waste drain line connected.	
Process Waste drain line connected	
Effluent line connected.	
Certified Electrician available during commissioning.	
Mechanical laborer available during commissioning.	
Power & grounds connected.	
Internet connection available and connected.	
Operators available for training.	





## 14 Commercial Offer

### 14.1 Pricing Table

Pricing for the proposed equipment and services is summarized in the table below.

<b>Base Price: Equipment, Consumables, &amp; Service</b>	
<b>Item #1</b> – One (1) ABMet® System for a 13 week Pilot Study.	<b>\$101,500</b>
<b>Total System Price for Item #1</b> On-site Commissioning Assistance, Freight to and from site as well as other scope items detailed in Section 15 are included in the total system price for Item #1.	<b>\$101,500</b>
<b>RO Adder Cost:</b> One (1) single pass reverse osmosis pilot per week. On-site Commissioning Assistance, Freight to and from site as well as other scope items detailed in Section 15 are included in the RO Adder Cost.	<b>\$4,800</b>
<b>ABMet Adder Cost:</b> One (1) ABMet® Pilot system extension on a per month basis.	<b>\$12,000</b>

\*all applicable taxes are not included in stated prices and will be added unless Client provides tax exemption certificate

### 14.2 Validity

Validity of the quoted system is valid for 30-days from the submission date of July 10, 2014. If an executed contract and formal purchase order are not received within this validity period, both the pricing and delivery schedule are subject to review and adjustment.

### 14.3 Invoicing and Payment Terms

The duration of the ABMet pilot study is assumed to be a total of thirteen (13) weeks including one (1) to two (2) weeks for commissioning activities, ten (10) to eleven (11) weeks for data collection and one (1) week for decommissioning activities. The RO pilot study is assumed to be five (5) weeks including (1) week for commissioning and decommissioning activities and four (4) weeks for data collection.

The invoicing structure will be set up as follows:

An initial invoice of 30% of the total Purchase Order value (plus applicable taxes) will be issued upon receipt of the equipment at the pilot site. The remaining 70% of the total Purchase Order value (plus applicable taxes) will be invoiced in two (2) installments after the fifth and thirteenth week of piloting. If the ABMet pilot rental is extended by the CLIENT to include additional time beyond the thirteen (13) week pilot study additional monthly invoices in the amount of \$12,000 USD will be issued. If the RO pilot rental is extended by the CLIENT to include additional time beyond the five (5) week pilot study additional weekly invoices in the amount of \$4,800 USD will be issued.

Payment terms are per Section 7 of the Project-Specific Subcontractor Services Agreement.





All Purchase Orders should be addressed to **ZENON Environmental Corporation c/o GE Water & Process Technologies and bear the Oakville, ON address of the GE W&PT Office as well as denote the applicable Proposal number.** Purchase Orders that do not adhere to these specifications will be deemed invalid and will require replacement.

If the CLIENT claims to have Tax Exemption status, a copy of their tax exemption certificate must be provided to GE W&PT with their signed agreement and purchase order. The tax exemption form must belong to the party being invoiced by GE W&PT. If this form is not provided, applicable taxes will be added to all invoices.

### 14.4 Equipment Shipment and Delivery

Pilots are allocated to customers on a first come, first served basis. Based on the current pilot equipment schedule, a delivery timeframe of the **middle of August 2014** is the earliest time that an ABMet® pilot would be available for this project. To secure a spot on the schedule the signed rental agreement in Appendix A and purchase order must be received within the validity period of this document. If the notification of award is delayed, the equipment delivery date may also be delayed. GE will do their best to expedite the shipping schedule if at all possible.

Upon receipt of the signed agreement and purchase order for the pilot study GE will arrange a kick-off meeting with all parties to develop a firm shipping schedule and discuss any required logistics details.

### 14.5 Pricing Notes

- ☐ All prices quoted are in U.S. dollars.
- ☐ The proposal and the rates provided herein are subject to final site, environmental and financial due diligence by GE.
- ☐ This proposal supersedes all previous proposals and correspondence.

### 14.6 Conditional Offering

CLIENT understands that this proposal has been issued based upon the information provided by CLIENT, and currently available to GE at the time of proposal issuance. Any changes or discrepancies in site conditions (including but not limited to system influent characteristics, changes in Environmental Health and Safety ("EH&S") conditions, and/or newly discovered EH&S concerns), CLIENT's financial standing, CLIENT's requirements, or any other relevant change, or discrepancy in, the factual basis upon which this proposal was created, may lead to changes in the offering, including but not limited to changes in pricing, warranties, quoted specifications, or terms and conditions. GE's offering in this proposal is conditioned upon a full GE EH&S, and CLIENT's financial review.





# 15 Scope of Supply Requirements

The Scope of Supply Requirements for GE W&PT and the Client/Customer are outlined in the following sections.

## 15.1 GE W&PT Scope of Supply

GE W&PT will provide the equipment as outlined in this document for an on-site evaluation at the pilot plant site for a period of thirteen (13) weeks. GE W&PT's direct scope of supply throughout the pilot study will include:

- ❑ GE W&PT will supply standard ABMet® pilot equipment for the evaluation study. Typical ABMet pilot equipment specifications are listed in Section 9. These specifications are subject to change and will be confirmed upon receipt of the signed Pilot Rental Agreement.
- ❑ GE W&PT will supply standard RO pilot equipment on a per week basis, as outlined in Section 10. These specifications are subject to change and will be confirmed upon receipt of the signed Pilot Rental Agreement.
- ❑ Pilots are allocated to Customers on a first come first served basis. Upon receipt of the executed Pilot Rental Agreement and PO, a pilot plant will be reserved and available for shipment the **middle of August 2014**, depending on the current availability at that time. This schedule is subject to change and can be expedited in certain circumstances or may need to be extended. Please note that if the notification of award is delayed, pilot availability may be delayed by the same amount of time.
- ❑ GE W&PT will arrange a kick-off meeting with the CLIENT upon receipt of the signed agreement and PO to discuss logistics, work plan and decide on a firm shipping date.
- ❑ GE W&PT will coordinate and be responsible for the cost of shipment of the pilot equipment to and from site.
- ❑ GE W&PT will provide at least ten (10) days of on-site support for pilot system installation, commissioning and operator training. Such site support will commence within five (5) working days from confirmation that the pilot equipment has arrived at site and that the site is fully prepared; 'Fully prepared' is defined as: power has been supplied to the pilot equipment, the source water and drain lines are available to be plumbed, source water is ready to be supplied and drain facilities are ready to receive discharge.
- ❑ GE W&PT will provide in-house technical support via telephone and e-mail during the testing period to ensure the completion of a successful pilot study.
- ❑ GE W&PT will monitor the ABMet® pilot operation remotely via a broad-band internet connection, Satellite (internet equipment requires open southern skies), or a cellular modem.





- ❑ GE W&PT will provide to the CLIENT, access to its online monitoring displays.
- ❑ GE W&PT will be responsible for providing replacement parts, which fail under normal operation.
- ❑ GE W&PT will provide on-site assistance for decommissioning the pilot equipment at the conclusion of the pilot study.
- ❑ GE W&PT will provide a report that summarizes the pilot study results, within twenty (20) working days after the pilot ships from site.

### 15.2 Client / Customer Scope of Supply

The Client / Customer will have the following responsibilities throughout the proposed pilot study.

- ❑ The CLIENT will notify GE W&PT of acceptance of its equipment for use in the pilot program at least four (4) to six (6) weeks before the expected equipment delivery date.
- ❑ The CLIENT in collaboration with GE W&PT will develop a testing protocol for the pilot study, prior to initiation of the pilot study.
- ❑ The CLIENT will prepare the site for installation and provide a hard, level surface (i.e. pavement, cement, packed gravel) for the pilot to be situated. The location for the pilot equipment will be in a safe working environment.
- ❑ The CLIENT will supply a shelter for the pilot equipment. The temperature in the shelter must be maintained above freezing and at less than 104°F (40°C). The shelter shall protect the equipment from environmental elements, is equipped with proper lighting and ventilation and is in a safe working environment.
- ❑ The CLIENT will provide a crane and qualified operator for unloading the system from the shipping truck, and the proper placement of the pilot equipment near the associated utilities required for the pilot study. Any equipment crates should remain on site for the purpose of shipping the equipment back to GE W&PT and should not be disposed of.
- ❑ The CLIENT will supply and connect to the pilot system an electrical power supply of the correct voltage and amperage rating as described in Section 9 and 10. The CLIENT will supply an appropriate transformer if it is required to achieve the specified pilot electrical requirements.
- ❑ The CLIENT is responsible for plumbing the source water line to the pilot system tie-point and supplying consistent feed water at the correct flow rates and pressure as specified in Section 9 and 10.
- ❑ The CLIENT is responsible for plumbing the discharge lines from the pilot system tie-points to suitable receiving facilities. If applicable, the CLIENT shall supply any pumps, tanks, and other equipment necessary to convey water from the site.





## GE Water & Process Technologies

- ❑ The CLIENT is responsible for supplying and installing any required interconnecting piping between the ABMet® and RO pilot equipment.
- ❑ The CLIENT will perform any piping requirements greater than 30 ft. in length (i.e. tie points should be located no more than 30 ft. away from the pilot; any piping required to bring the tie point to within 30 ft. is the Client's responsibility).
- ❑ The CLIENT is responsible to receive waste streams and dispose of these streams in compliance with local regulations.
- ❑ The CLIENT is responsible to obtain any necessary permits, including but not limited to, those required to withdraw water, discharge water to receiving body (including chemicals), building permits, electrical permits and inspection of compressed cylinder permits.
- ❑ GE W&PT personnel will not be deployed to site for start-up and commissioning services until all site preparations are completed by the CLIENT and GE is notified in writing that these tasks are completed. This will ensure that GE personnel will be able to complete all start-up and commissioning tasks upon arrival at the project site. In the event that preparation tasks identified as being complete are found to be incomplete upon arrival at site, GE W&PT will be entitled to back charge the CLIENT for delays associated with incomplete site preparation tasks. Charges will be billed as GE Field Service Labor Rates provided below.

All currency figures are in U.S. dollars		Week Days		Weekend Days & Statutory Holidays	
On Site		/ Hour	/ Day	/ Hour	/ Day
Service Representative		\$ 120	\$ 1,200	\$ 170	\$ 1,700
Programmer or Process Engineer		\$ 135	\$ 1,350	\$ 190	\$ 1,900
Off Site - including trip preparation, travel time, telephone support, and reporting.					
Service Representative		\$ 105		\$ 145	
Programmer or Process Engineer		\$ 125	\$ 1,250	\$ 165	\$ 1,650
Hotel, airfares, flight change fees, rental car and related travel expenses		1.15 times the cost			
Meals		\$52.00 per day			

- ❑ The CLIENT shall provide plant operators for the daily operation and maintenance of the pilot systems. ABMet® and RO pilot equipment normally requires less than 4 hours per day for maintenance, monitoring, and sampling of the water streams. Based on previous experience, GE W&PT estimates that the first few weeks of operation will require additional attention and time as the operators become familiar with the system and while the process is optimized
- ❑ The CLIENT shall provide any on-site safety training required for the GE W&PT Field Service Representative or Project Manager.
- ❑ The CLIENT will be responsible for collection, shipment and laboratory analysis of all water samples required for the pilot study.





## GE Water & Process Technologies

- ☐ The CLIENT will provide any required pre-treatment chemicals for the duration of the pilot study.
- ☐ The CLIENT shall arrange to have all laboratory data communicated directly to GE W&PT as soon as it is generated, and no longer than one week from the sample event.
- ☐ The CLIENT will be responsible for the removal and proper disposal of the activated carbon at the completion of the pilot study.
- ☐ The CLIENT will be responsible for the proper disposal of any unused chemicals at the completion of the pilot study.
- ☐ The CLIENT will be responsible for the cost of labour and other expenses associated with the installation of any replacement parts, provided special tools and labour are not required.
- ☐ The CLIENT will bear the cost of repairs for any damage to the pilot equipment, directly caused by the CLIENT, which resulted from improper handling or operation of the unit and not the result of ordinary wear and tear. Ordinary wear and tear shall mean only the normal deterioration caused by reasonable and proper use of the Equipment. If the Equipment or its reusable shipping crate are returned damaged or with parts missing, the CLIENT shall pay GE W&PT the greater of the cost of repairing the Equipment/crate, or \$1,000.00 USD.
- ☐ The CLIENT will be responsible for the pilot equipment decommissioning procedure. It is expected that the pilot equipment be returned to GE W&PT in the same condition as it arrived, excepting normal equipment wear and tear (as defined by GE).
- ☐ The CLIENT will provide crane and qualified operator for loading the system on to the shipping truck at the completion of the pilot study for return to GE.





## Appendix A. Pilot Rental Agreement

The Project-Specific Subcontract Agreement between Golder Associates Inc. and GE Water & Process Technologies, dated 20MAR2013 supersedes terms and conditions in this proposal. Applicable parts of the Rental Agreement and Standard GE W&PT Terms and Conditions were incorporate into the Project-Specific Agreement.





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## Appendix B. ABMet Pilot Equipment Drawings





**DRAWINGS**

**FOR**

**GE WATER & PROCESS TECHNOLOGIES  
DEMONSTRATION BIOLOGICAL FILTER F300  
PROJECT 1367**

**FOR**

**O & M**

**RELEASE #2**

**SEPTEMBER 9, 2011**



## **SPRUNG STRUCTURE PROPOSAL**





## High Performance Building Solutions

[www.sprung.com](http://www.sprung.com)  
NORTH AMERICA  
**1.800.528.9899**

August 5, 2014

Karen Budgell  
Golder Associates Inc.  
44 Union Blvd. Ste 300  
Lakewood, CO 80228

Telephone: 303-980-0540  
Email: [karen.budgell@golder.com](mailto:karen.budgell@golder.com)

Dear Ms. Budgell,

We are pleased to submit the following quotation for a Sprung Structure to be located at your site in Soda Springs, Idaho. Sprung is the inventor of the stressed membrane structure, patented worldwide. In business for over 126 years, Sprung offers innovative, cost effective, high performance building solutions which dramatically accelerate construction time lines while providing complete flexibility for the future.

### STRUCTURE DESCRIPTION:

SIGNATURE SERIES, 30 feet wide by 30 feet long, measured by maximum width by maximum length, including the following accessories:

- 4 - base level spreader(s) 15' bay
- 1 - complimentary graphic logo at entrance
- 10 - earth anchors
- 2 - engineered flat end(s) c/w cable bracing as required
- 1 - flat end sliding cargo door(s)
- 4 - high bay 400w metal halide light(s) - 60hz - 120/208/240/770 voltage
- 10 - interior suspension eyenut(s) maximum load 75 LBS
- 2 - penetration kit(s) for non-insulated structures (small) 1/4" to 4"
- 1 - single personnel door(s) hood (3'0"x7'0") in flat end
- 2 - standard framed opening(s) - size 4' 0" wide x 4' 0" high and smaller
  - conduit holes as per diagram provided by Sprung
  - engineered stamped drawings

**NOTE:** It is the responsibility of your contractor to connect any and all electrical for any options requiring power. Electrical specifications can be provided.

### ARCHITECTURAL MEMBRANE AND

**COLOR SELECTION:** **Acrylic** opaque membrane, complete with daylight panels.

**DELIVERY:** Normally from inventory. Customer is responsible to receive and unload freight.

### INTERIOR

**HANGING DETAILS:** Sprung Instant Structures offers a large selection of brackets and hangers which can be utilized for the hanging of lighting, HVAC and any other items that may need to be suspended from the interior of the structure. The type and size in





each case will depend on weight and proposed position. Please contact your Sprung representative for diagrams and further details.

**ERECTION:**

We will supply a Technical Consultant on site at no charge, to provide information about structure assembly and erection. The Technical Consultant is not authorized to perform any other services. Customer is responsible for supervision of and safety compliance in structure location, assembly and erection.

Recommended equipment and manpower:

- a) Scaffolding or manlifts
- b) Appropriate fall protection (body harness and life line).
- c) Electrical power to site.
- d) Estimated 4 workmen for approximately 5, 8 hour working days, approximately half of which should be man lift qualified.
- e) A supervisor with construction experience.

**PICKER:**

We request that you supply a picker to assist in raising the free span aluminum beams during the erection sequence. It will be needed for approximately 2 hours.

**HAND TOOLS:**

Although specialized hand tools are supplied for your use at no charge, you are responsible for the tools while they are at your site and until picked up by Sprung following completion of the erection of the structure.

**ANCHORAGE:**

**Raw Earth or Asphalt** - Earth anchors, in connection with drift pins may only be used providing adequate soil conditions exist. Base reactions will be provided where required. A compressor complete with 90 lb. jack hammer, will be needed to install these anchors. In order to optimize the erection time for the structure, earth anchors should be installed prior to delivery of the structure and prior to arrival of the technical consultant. The time to install these anchors is not included in the time estimate above. A detailed drawing will be provided by Sprung showing anchor locations. **NOTE FOR ASPHALT ONLY:** Perimeter aluminum flat bar will be supplied to secure the architectural membrane to the asphalt pad. The quality of the asphalt will determine the effectiveness of this procedure. It should also be noted that flat bar will not stop surface water from migrating into the structure since there is no means of ensuring a water tight seal when attaching flat bar to asphalt.

**DISMANTLING:**

Leased structures will require our Technical Consultant for dismantling. The same terms as outlined above under the heading "Erection" and "Technical Consultant" will apply. It will be your responsibility to return the structure and tools, prepaid, to the depot in Salt Lake City, Utah.





LEASE PRICING	
LEASE PRICES ARE FOR SALT LAKE CITY, UTAH; SALES AND OR USE TAXES EXTRA:	
4 MONTH FIRM LEASE FOR STRUCTURE PAYABLE MONTHLY IN ADVANCE:	\$5,531.00/month
DELIVERY: At your request we can arrange, on your behalf, for delivery of this structure by commercial carrier to your site in Soda Springs, Idaho.	\$2,100.00
TECHNICAL CONSULTANT'S TRAVEL, MEALS & ACCOMODATION WILL BE CHARGED AT A FIXED COST: (Cost is based on 8 hour days, 5 days per week. Any request for overtime must be agreed in writing before overtime takes place, and at a rate of \$40.00 per hour)	\$2,160.00
TERMS, O.A.C.: PAYABLE MONTHLY IN ADVANCE.	
<p>PURCHASE OPTION</p> <p>THE LESSEE HAS THE OPTION TO PURCHASE THE STRUCTURE AS FOLLOWS:</p>	<p>If all lease payments have been made on time during the first three months of the lease period, 100% of these payments will be credited towards the purchase price, <u>or</u> alternatively</p> <p>If all lease payments have been made on time during the first 4 months of the lease period, 70% of all 4 payments will be credited towards the purchase price, <u>or</u> alternatively</p>
NOTE: ANY PURCHASE OPTION CAN BE EXERCISED BY PRESENTATION OF LESSEE'S CHECK FOR THE FULL PURCHASE PRICE, LESS THE APPLICABLE CREDIT, PRIOR TO THE EXPIRY OF THE APPLICABLE LEASE PERIOD.	





PURCHASE PRICE	
PURCHASE PRICE FOR SALT LAKE CITY, UTAH; SALES AND OR USE TAXES EXTRA:	
STRUCTURE AND ACCESSORIES AS ABOVE:	\$52,039.00
DELIVERY: At your request we can arrange, on your behalf, for delivery of this structure by commercial carrier to your site in <b>Soda Springs, Idaho.</b>	\$2,100.00
TECHNICAL CONSULTANT'S TRAVEL, MEALS & ACCOMODATION WILL BE CHARGED AT A FIXED COST: (Cost is based on 8 hour days, 5 days per week. Any request for overtime must be agreed in writing before overtime takes place, and at a rate of \$40.00 per hour)	\$2,160.00
TOTAL PURCHASE PRICE:	\$56,299.00
TERMS, O.A.C.: 50% WITH ORDER; BALANCE UPON DELIVERY OF THE STRUCTURE	

**PERMITS,  
LICENSES AND  
TAXES:**

It will be your responsibility to obtain all permits and licenses and pay all applicable taxes. This structure is designed to meet 90 mph, Exposure C, 3 second gust as per ASCE-7-2005 and IBC-2009.

**NOTE:**

This quotation is valid for 60 days.

**GUARANTEE:**

Thank you for the opportunity to submit this quotation. To demonstrate our confidence in the quality and longevity of the Sprung Structure, our product comes with a 30 year pro-rata guarantee on the aluminum substructure and a 12 year pro-rata guarantee on the architectural membrane, all in accordance with the Certificate below.

Best Regards,

Rob Ekblad  
Business Development Manager  
Sprung Instant Structures, Inc.  
[rob.ekblad@sprung.com](mailto:rob.ekblad@sprung.com)



# Sprung Instant Structures

## Guarantee

Presented to  
**GOLDER ASSOCIATES INC.**

The architectural membrane and aluminum materials utilized in Sprung Structures have been selected for their proven strength, durability and longevity. To show our sincere confidence in our product, Sprung Instant Structures is pleased to issue the following guarantees.

### **ARCHITECTURAL MEMBRANE WITH ACRYLIC COATING**

All membranes used are water and mildew resistant, insect proof and flame retardant. They withstand extreme climatic variations and contain ultra-violet inhibitors to reduce degradation by the sun's rays. Flame retardant status has been warranted by the membrane suppliers.

Sprung Instant Structures guarantees to supply new replacement membrane, on a pro-rata basis at the then current price, for membrane which deteriorates from any of the aforementioned factors within TWELVE (12) YEARS from the date of delivery of the structure(s), for acrylic coated architectural membranes in white, tan or gray colors.

### **EXTRUDED ALUMINUM SUBSTRUCTURE AND COMPONENTS**

Aluminum used is professionally engineered and is of the highest quality and structural capability. Sprung Instant Structures guarantees to replace, on a pro-rata basis at the then current price, any aluminum which deteriorates from normal usage within THIRTY (30) years from the date of delivery of the structure(s).

The guarantee will not be valid if a Sprung technical consultant is not present during all erections and dismantling's of the structure during the guarantee period or if any payments associated with the structure(s) are not made on time.

August 5, 2014

PHIL SPRUNG - PRESIDENT

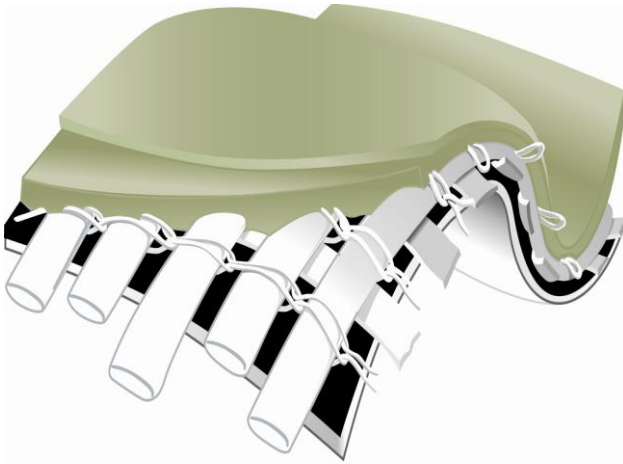


## ALUMINUM SUBSTRUCTURE



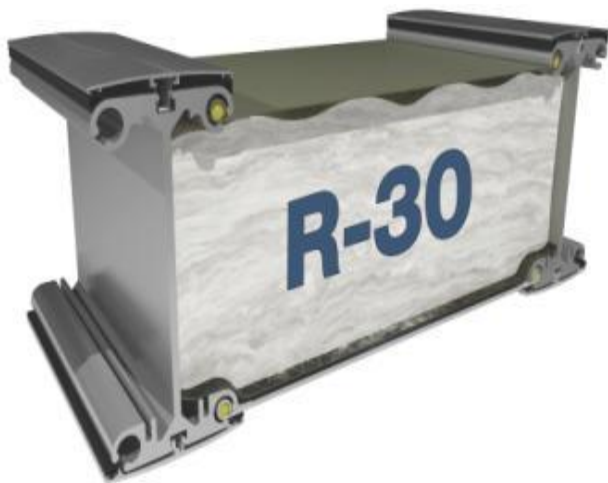
- Our extruded aluminum substructure has an indefinite life expectancy, is lightweight, strong and maintenance-free.
- Guaranteed on a pro-rata basis for 30 years.
- Unlike steel and wood, aluminum performs extremely well in humid environments and is rustproof.
- Aluminum is easier to construct and more cost effective to ship at 1/3 the weight of steel.
- Aluminum can be configured to almost any shape.

## PERFORMANCE ARCHITECTURAL MEMBRANE



- Simply the longest-lasting fabric of its type in the world.
- Blackout layer prevents solar gain and extends life.
- Exceptional fire-retardant capability.
- Optional daylight panels for the introduction of natural light.
- Premium Tedlar/Kynar or Standard Acrylic membranes chosen will depend on lifespan of the project.
- Guarantees from 12 years to 20 years with life expectancy 15 and 25 years respectively.

## FIBERGLASS INSULATION BLANKET



- R values of R25 and R30 relate to a dramatic energy savings.
- Our double layer vapor barrier of highly tensioned membrane results in a virtually air tight structure.
- A reflective foil backing retains and reflects heat.



## THE ERECTION SEQUENCE

The Sprung Structure arrives at your site in a “knocked down” format (unassembled). Our Technical Consultant will be scheduled to arrive at the beginning of construction and remain until completion to provide information about the structure assembly and erection. A set of specialized hand tools are supplied by Spruna for the erection process.

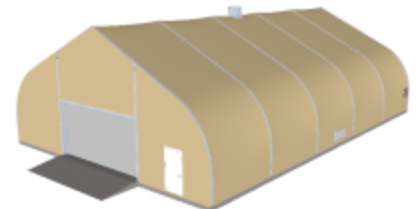
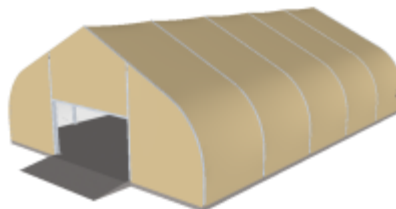
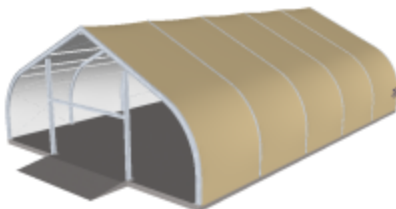
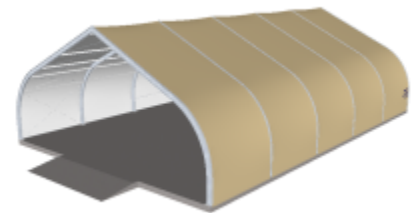
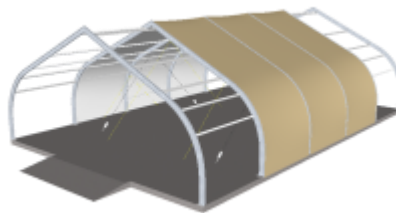
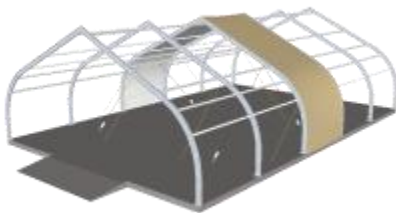
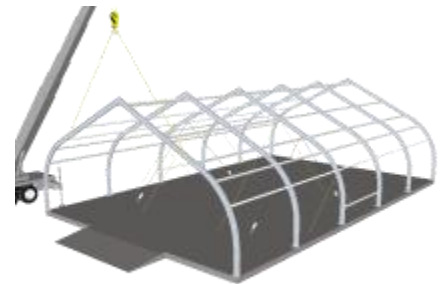
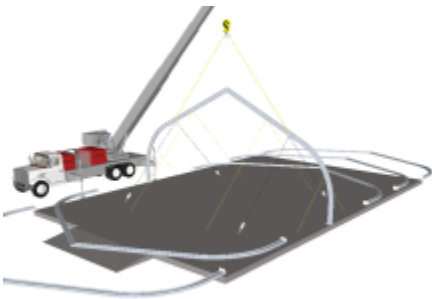
**Knocked Down Shipment**



**Specialized Hand Tools**



**Technical Consultant**





## PERSONNEL DOORS, CANOPIES, VESTIBULES & CORRIDORS

Safety being of the utmost concern;

Personnel doors are mounted in protective hoods to divert snow and rain water away from the entrances.

Personnel Door Substructure



Double Personnel Door w/Glass



Triple Glass Door



Canopies provide added protection from shedding rainwater or snow.

Door Canopy



Door Canopy



Door Canopy



Vestibules are ideal for enhancing the entrance and maintaining consistency in climate control.

Vestibule



Vestibule



Vestibule



Connecting corridors provide enclosed space when connecting two structures.

Connecting Corridor



Connecting Corridor



Connecting Corridor





## WINDOWS AND GLAZING WALLS

Distinctive tempered safety glass windows and glazing walls are available in a variety of styles and configurations.

Options include energy efficient thermal-pane, argon-filled glass.

39" x 39" Window c/w Slider



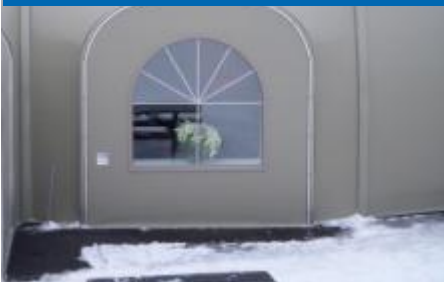
39" x 85" Window c/w Sliders



85" x 63" Window



Gothic Style



Rake Style



Elliptical Style



8' High Glazing Wall



8' High Glazing Wall - Interior



Custom Glazing Wall



Custom Glazing Wall



Custom Glazing Wall - Interior



Custom Glazing Wall - Interior





## CARGO DOORS

End Sliding Cargo Door



Side Sliding Cargo Door



Flat End Sliding Cargo Door



Rolling Service Door



Seasonal Opening Door



Seasonal Opening Door



Double Panel Rolling Door



Triple Panel Rolling Door



Quadruple Panel Rolling Door



Hydraulic Hangar Door



Vertical Lift Hangar Door



Telescoping Hangar Door





## ACCESSORIES

**Hood Light Over Door**



**Green Energy Induction 250W**



**Metal Halide 400W**



**Wind Driven Hurricane Vent**



**Electric Exhaust Fan**



**Penetration Kit**



**Framed Opening**



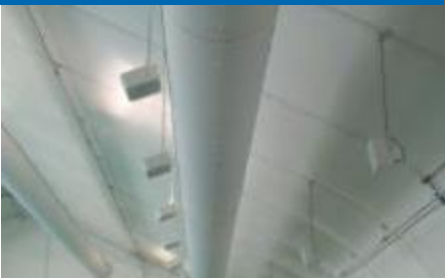
**Louvered Opening**



**Air Pressure Release Vent**



**DuctSox Fabric Ducts – By**



**DuctSox Fabric Ducts – By**



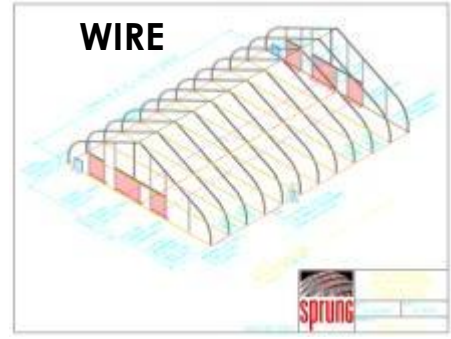
**Exterior HVAC**





## RENDERINGS

Sprung can provide a photorealistic rendering or wire frame of your proposed structure to assist in generating a real life representation or 3D representation of the proposed facility.





## SPRUNGSHIELD

Lightweight rolled aluminum forms to the natural contour of the structure to provide a seamless transition from fabric to protective shield. SprungShield provides enhanced protection where vandalism is of greater concern. Available in a variety of colors to the height of 8' around the perimeter and available on the interior and exterior.





## GRAPHICS & CORPORATE LOGOS

Custom graphics and creative wainscots are an ideal way to brand your structure with corporate colors and patterns. With our Kynar matching program Sprung can offer virtually any color.





## **CFM COMPANY PROPOSAL**





# CFM COMPANY

AIR CONDITIONING / HEATING / VENTILATING EQUIPMENT

www.cfmcompany.com

QUOTATION No. 27215-DN 01

- ☐ **Main Office** • 1440 South Lipan Street • Denver, CO 80223-3411 • Phone: (303) 761-2291 • Fax: (303) 761-0325
- ☒ **CFM/BAC** • 602 South Lipan Street • Denver, CO 80223-2307 • Phone: (303) 761-2291 • Fax: (303) 777-8531
- ☐ **CFM North** • 413 D North US Highway 287 • Fort Collins, CO 80524-4853 • Phone: (970) 493-7293 • Fax: (970) 493-7297
- ☐ **CFM South** • 4260 Buckingham Drive #130 • Colorado Springs, CO 80907-3778 • Phone: (719) 528-1116 • Fax: (719) 528-6892
- ☐ **CFM West** • 575 South Westgate Drive Unit C • Grand Junction, CO 81505-6958 • Phone: (970) 243-4377 • Fax: (970) 243-0068

Golder Engineering

Attn: Ray Anderson

303-483-8110 Cell

720-920-4603

ray\_anderson@golder.com

Date: August 5, 2014

Project Name: Pilot Plant

Location: Idaho

Architect:

Engineer: Golder Engineering

Ray,

Qty one (1) Make Up Air Unit by Greenheck Fan Corporation

- Model MSX-109-H12 as per attached submittals
- 7.5 hp motor, 460/3
- Rated for 1,000 CFM, at 0.5 ESP @ 6,000 feet of elevation
- Electric heat 460/3
- 100% outside air
- SCR Controls
- Birdscreen
- MERV 8 Filters
- Inlet damper
- Insulated unit
- Control Center with:
- Freeze protection
- Heat inlet air sensor
- 1 NO/NC on Supply starter
- Industrial remote panel
- No cooling
- Approximate dimensions are 148-1/4" long X 33" wide X 33-7/16" high
- Approximate weight is 834#
- Selected options and accessories listed on the attached submittal sheets

**Total Net Price: \$7,989.00 Full Freight Allowed**

**Current production lead time is 15-16 days + 3-4 days transit time**

**Exclusions/clarifications:**

- Taxes are not included.
- No assembly, installation, or warranty labor included.
- Orders received after 10 AM (MST) will be processed on the next business day.
- Temperature controls, controllers, valves, actuators, sensors, switches, etc., are not included unless otherwise noted
- Roof curb is not included
- Warranty for Greenheck is 18 months from shipment or 12 months from startup, whichever occurs first.
- Warranty is for parts replacement only. Labor for replacement is by others.
- Submittals available 1-2 days after notice to proceed.

Unless otherwise noted, this quotation is offered as follows: Shipments are F.O.B. point of manufacture with freight allowed to first destination. Payment terms are Net 30 Days. Sales and use taxes are not included. Quotation is subject to acceptance within 30 days. Prices quoted are firm provided release to ship is made within 30 days from date of order, not to exceed 60 days from the date of this quotation. All quotations and sales are made in accordance with CFM COMPANY - STANDARD TERMS AND CONDITIONS OF SALE included on the last page of this quotation.





# CFM COMPANY

Page 2 of 3

Quotation No. 27215-DN 01

Date: August 5, 2014

Project Name: Pilot Plant

Customer P.O.# \_\_\_\_\_

Name: \_\_\_\_\_

Equipment is approved for production as per this proposal and attached submittal.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please call if you have any questions.

Thank you,

Larry Gelin / Gabrielle Larson / Dave Nimetz

303-607-4420 / 303-607-4455 / 303-607-4456

[larryg@cfmcompany.com](mailto:larryg@cfmcompany.com) / [gabriellel@cfmcompany.com](mailto:gabriellel@cfmcompany.com) / [daven@cfmcompany.com](mailto:daven@cfmcompany.com)

[www.cfmcompany.com](http://www.cfmcompany.com)

[www.greenheck.com](http://www.greenheck.com)



## CFM COMPANY - STANDARD TERMS AND CONDITIONS OF SALE

**TAXES** - All Federal, State and Local taxes, use, or similar taxes will be for buyer's account.

**PAYMENT TERMS** - The net amount of invoices shall be due and payable in cash 30 days after invoice date. The material is subject to shipment in whole or in part at the option of the seller and each shipment is subject to immediate invoicing. If at any time, seller deems the financial responsibility of the buyer unsatisfactory, it reserves the right to require payment in advance, or other security or guarantee that invoices will be paid promptly when due. If buyer fails to comply with the terms of payment or with any other terms of sale, seller shall have the right to withhold further deliveries or to cancel the unfilled portion of any order and all unpaid accounts shall thereupon become due and payable without prejudice to any claims for damages seller may be entitled to make. A service charge of 1 1/2% per month (18% per annum but not in excess of the lawful maximum) will be added on any past due accounts, and if the account is not paid when due buyer agrees to pay all reasonable costs of collection including a reasonable sum for attorney's fees.

**SHIPMENT** - SHIPMENTS ARE F.O.B. POINT OF MANUFACTURE WITH FREIGHT ALLOWED. All risk of loss, damage and other incidence of title and ownership shall pass to the buyer upon delivery to carrier at seller's shipping point and such delivery shall constitute delivery to purchaser. Shipping dates or time of arrival of shipment at destination will not be guaranteed by seller. Seller shall not be liable for any delays or defaults in making shipment where occasioned by any cause of any kind or extent beyond its control, or the control of its suppliers, manufacturers or contractors, which prevent or interfere with seller making shipments on an estimated date. In event of shipping delay, if the buyer and seller do not mutually agree to cancel the order for the item involved, the shipping date shall be automatically extended to the manufacturer's current estimate.

**WARRANTY** - Any warranties expressed or implied are limited to those provided by the manufacturer to the purchaser. Seller expressly warrants title, EXCEPT FOR SUCH EXPRESS WARRANTY, SELLER MAKES NO WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, AND ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND OTHER WARRANTIES OF WHATEVER KIND, ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED. Seller assumes no liability for any failure of buyer's specifications to meet buyer's requirements, nor does seller guarantee that materials furnished meet or conform to any specifications except as specifically noted in writing by seller.

**CLAIMS** - Any claims or exceptions by buyer for defective material must be made in writing within 30 days after buyer's receipt of materials, and buyer shall give seller an opportunity to investigate. SELLER IS FURNISHING BASIC MATERIALS AND PRODUCTS OF VARIOUS MANUFACTURERS AT STANDARD PRICES AND IS NOT INSURING BUYER AGAINST POSSIBLE CONSEQUENCES OF ERROR, OMISSIONS OR NEGLECT IN MANUFACTURE, PRODUCTION OR DELIVERY. EXCEPT FOR BREACH OF THE EXPRESS WARRANTY SPECIFIED ABOVE, SELLER SHALL NOT, UNDER ANY CIRCUMSTANCES BE LIABLE ON ACCOUNT OF ANY IMPERFECTION, DEVIATION FROM SPECIFICATIONS OR OTHER DEFECT IMPAIRING THE QUALITY, VALUE OR SUITABILITY FOR ANY PURPOSE, OF ANY PRODUCT OR MATERIAL SOLD HEREUNDER, WHETHER CAUSED BY SELLER'S NEGLIGENCE OR OTHERWISE. IN NO EVENT SHALL SELLER BE LIABLE FOR CONSEQUENTIAL, SPECIAL OR CONTINGENT DAMAGES, OR ANY OTHER CLAIM OR DEMAND WHATSOEVER, EXCEPT TO THE EXTENT OF THE PURCHASE PRICE OF THE PRODUCT, THE REFUND OF WHICH SHALL BE BUYER'S SOLE AND EXCLUSIVE REMEDY HEREUNDER. BUYER ASSUMES ALL RISK OF LOSS, DAMAGE, OR DELAY INCIDENT TO THE FURNISHING OF ANY PRODUCT BY SELLER HEREUNDER, OR THE UTILIZATION THEREOF, EXCEPT TO THE EXTENT EXPRESSLY ABOVE PROVIDED. Seller shall have no responsibility to make any claim for loss, damage or injury to shipments caused by a carrier or others, after delivery to carrier at seller's shipping point. Any claim by buyer against seller for shortage or damage occurring prior to delivery to carrier must be made within 5 days after receipt of materials and accompanied by original transportation bill signed by carrier noting that carrier received material from shipper in the condition claimed.

**GENERAL** - All prices on seller's quotations are for acceptance within thirty days unless otherwise stated in writing. Neither seller's quotation prices nor invoice charges for materials include any field or service work, or operator training, unless so stated in writing. The right to correct typographical errors is reserved.

When seller's quotation prices or invoice charges for materials include standard shipping charges, it is understood the method of shipment will be at the seller's option, and buyer is responsible for furnishing labor and equipment for unloading within the time limit allowed by the carrier. Seller's quotations do not guarantee to include all materials required for a specific project, nor that the material quantities, sizes or specifications noted are correct. Buyer assumes all liability for type and quantity of materials ordered. Orders are not subject to cancellation, return or back charge, or change in specifications, shipping schedules or other conditions without the seller's written consent. When orders have been filled as specified, no items may be returned, nor will any credit be allowed, unless consent of seller has first been secured, and only standard stock items returned will, if accepted, be credited less the cost of handling and the freight costs involved. Materials not normally stocked by seller may not be returned for credit.

Except as otherwise provided, all quotations and sales shall be subject to seller's standard terms and conditions and buyer is conclusively presumed to have accepted such terms and conditions unless otherwise agreed in writing. ORDERS designated to be invoiced directly by the manufacturer are subject to acceptance by such manufacturer and to such manufacturer's terms and conditions, and also to the terms and conditions of CFM Company. In the event of inconsistency or conflict between the terms and conditions of the manufacturer and CFM Company, the manufacturer's terms and conditions which are involved in such inconsistency or conflict shall take precedence.

Until all amounts owed by the purchaser to CFM Company pursuant to the terms and conditions and any other contract between CFM Company and the purchaser are collected and paid in full, CFM Company retains a security interest in the goods supplied and the purchaser grants to CFM Company a purchase money security interest under the Uniform Commercial Code in and lien upon such goods, as well as all attachments, additions, and accessions thereto, all as security for the payment of all such amounts and the performance by the purchaser of all its obligations to CFM Company. The purchaser acknowledges that this security interest continues in all proceeds of such goods, attachments, additions, and accessions, including cash, checks, notes, accounts receivable, proceeds of the unearned premiums on property insurance and other collections received by the purchaser. The purchaser further acknowledges that CFM Company's purchaser money security interest continues notwithstanding any attachment or affixing of the goods, attachments, additions or accessions to real estate.

In the event buyer's purchase order states terms additional to or different from these terms and conditions of sale, then seller's acknowledgment in accordance with the terms herein shall be deemed a notification of objection to such additional or different terms, or in the event such purchase order expressly limits acceptance to its terms the seller's acknowledgment shall constitute an offer to sell which may be accepted only in accordance with its terms and conditions without modification, addition or alteration. Under those circumstances the failure of buyer to deliver notification of objection to these terms and conditions of sale within a reasonable time shall be deemed an acceptance thereof and a contract shall be formed only upon such terms and conditions of sale.

This agreement constitutes the sole and entire agreement between buyer and seller and none of the terms and conditions contained herein may be added to, deleted, modified or altered except by written instrument signed by seller. There are no oral understandings, representations or agreements relative to this agreement, which are not fully expressed herein. The laws of the State of Colorado shall govern the validity, interpretation and enforcement hereof. All orders are received subject to approval and acceptance by an officer of CFM Company and seller reserves the right to reject any orders as well as the right to select its own customers.



## **EATON PROPOSAL**



## Detail Bill of Material

**Project Name:** Monsanto  
**General Order No:**

**Negotiation No:** E2070619X4K1  
**Alternate No:** 0000

Item No.	Qty	Product	Description
	1	Panelboards	30Circuits, 125A, Fully Rated, 208Y/120V 3Ph 4W, Silver Plated Copper Bus, 10k AIC, 100A, 3P BAB-H Main Breaker[Top Fed], Surface Mounted
		<b>Catalog No</b>	P1A225BT363R
		<b>Designation</b>	LP-Pilot
	<b>Qty</b>	<b>List of Materials</b>	
	1	100A, 3P BAB-H Main Breaker	
	12	Padlockable Lockoff Device	
	1	60A, 2P BAB Branch Breaker	
	11	20A, 1P BAB Branch Breaker	
	5	15A, 1P BAB Branch Breaker	
	12	1P BAB Branch Provision Only	
	1	Silver-Plated Copper Main Bus, 225 Amps	
	1	Std. Bolted Al Ground Bar (Al/Cu Cable)	
	1	Panel Nameplate - White with Black Letters	
	1	Type 3R Enclosure: LWPQ2036	

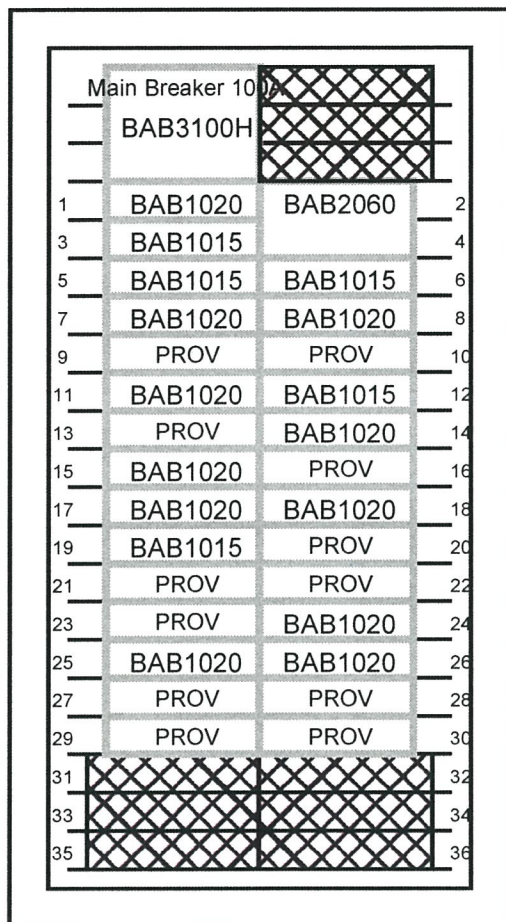
  

Item No.	Qty	Product	Description
	1	Panelboards	27Circuits, 250A, Fully Rated, 480Y/277V 3Ph 4W, Silver Plated Copper Bus, 25k AIC, 250A, JD 3P Main Breaker[Top Fed], Surface Mounted
		<b>Catalog No</b>	P3D250BT303R
		<b>Designation</b>	PP-Pilot
	<b>Qty</b>	<b>List of Materials</b>	
	1	250A, JD 3P Main Breaker	
	2	Padlockable Hasp Lockoff Device	
	1	Padlockable Hasp Lockoff Device	
	1	45A, 3P HFD Branch Breaker	
	1	15A, 3P HFD Branch Breaker	
	1	40A, 3P HFD Branch Breaker	
	2	35A, 3P HFD Branch Breaker	
	1	60A, 3P HFD Branch Breaker	
	2	3P HFD Branch Provision Only	
	1	30A, 3P HFD Branch Breaker	
	1	Surge Protective Device, 120 kA SPD Series - Standard	
	1	Silver-Plated Copper Main Bus, 250 Amps	
	1	Std. Bolted Al Ground Bar (Al/Cu Cable)	
	1	Panel Nameplate - White with Black Letters	
	1	Type 3R Enclosure: LWPQ2072	

Eaton Selling Policy 25-000 applies.

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.





## General Information

(Section 1 of 1)

**Service Voltage:** 208Y/120V 3Ph 4W **Enclosure:** Type 3R  
**Bus Rating & Type:** 225A Silver Plated Copper **Neutral Rating:** 225A  
**Ground Bar:** Std. Bolted Aluminum, Al or Cu cable  
**S.C. Rating:** 10k A.I.C. Fully Rated

**Main Device Type:** Main Breaker - Top Cable Entry  
**Main Terminals:** Mechanical - (1) #8-1/0 (Cu/Al)  
**Neutral Terminals:** Mechanical - (1) #6-300 kcmil (Cu/Al)  
**Box Catalog No.:** LWPQ2036  
**Trim:** Complete Enclosure (Includes Trim)

Surface Mounted

**Box Dimensions:** 36.00" [914.4mm]H x 20.00" [914.4mm]W x 6.5" [165.1mm]D  
**Min. Gutter Size:** Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm]  
 Left = 6.0" [152.4mm] Right = 6.0" [152.4mm]

**Panel ID Nameplate:** (1) LP-Pilot  
**Type:** Plastic, adhesive-backed (2) 208Y/120V 3Ph 4W  
**Color:** White with Black Letters (3)

**NEC Lighting & Appliance, UL CTL** \*\*\*Non-Interchangeable Main Device\*\*\*

Trim Lock: T-Handle Lock Assembly  
 Circuit Directory: Plastic Sleeve with Card  
 Painted Box: ANSI 61  
 Main Circuit Breaker Trip Type: Thermal-Magnetic.

## Device Modifications:

**Ref #** **Description**  
 1256C41G05 Padlockable Lockoff  
 Ckt #:1, 7, 11, 15, 17, 25

## Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
11	1	20	BAB	100	10
1	2	60	BAB	100	10
5	1	15	BAB	100	10
12	1		PROV		

Notes:

The information on this document is created by Eaton Corporation. It is disclosed in confidence and it is only to be used for the purpose in which it is supplied.

PREPARED BY  
RONALD RANES

DATE  
7/31/2014

Eaton

APPROVED BY

DATE

JOB NAME

Monsanto

DESIGNATION

LP-Pilot

VERSION

1.0.0.1

TYPE

PRL1a

DRAWING TYPE

Customer Approval

NEG-ALT Number  
E2070619X4K1-0000

REVISION  
0

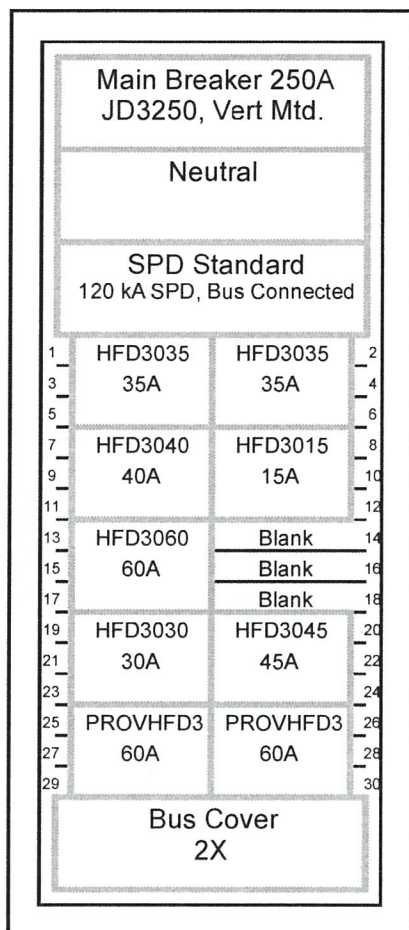
DWG SIZE  
A

G.O.

ITEM

SHEET  
1 of 1





## General Information

(Section 1 of 1)

**Service Voltage:** 480Y/277V 3Ph 4W **Enclosure:** Type 3R  
**Bus Rating & Type:** 250A Silver Plated Copper **Neutral Rating:** 250A  
**Ground Bar:** Std. Bolted Aluminum, Al or Cu cable  
**S.C. Rating:** 25k A.I.C. Fully Rated

**Main Device Type:** Main Breaker - Top Cable Entry  
**Main Terminals:** Mechanical - (1) #4-350 kcmil (Cu/Al)  
**Neutral Terminals:** Mechanical - (1) #6-350 kcmil (Cu/Al)  
**Box Catalog No.:** LWPQ2072  
**Trim:** Complete Enclosure (Includes Trim)

Surface Mounted

**Box Dimensions:** 72.00" [1828.8mm]H x 20.00" [1828.8mm]W x 6.5" [165.1mm]D  
**Min. Gutter Size:** Top = 5.5" [139.7mm] Bottom = 5.5" [139.7mm]  
 Left = 4" [101.6mm] Right = 4" [101.6mm]

**Panel ID Nameplate:** (1) PP-Pilot  
**Type:** Plastic, adhesive-backed (2) 480Y/277V 3Ph 4W  
**Color:** White with Black Letters (3)

UL

Trim Lock: T-Handle Lock Assembly  
 Circuit Directory: Plastic Sleeve with Card  
 Painted Box: ANSI 61  
 Main Circuit Breaker Trip Type: Thermal-Magnetic.

## Device Modifications:

**Ref #** **Description**  
 PLK1 Padlockable Hasp Lockoff  
**Ckt #:19, 20**  
**Main Device Mods:**  
 PLK3 Padlockable Hasp Lockoff Device

## Branch Devices

Qty	Poles	Trip	Frame	Amps	kAIC
1	3	30	HFD	100	25
1	3	45	HFD	100	25
2	3		PROVHFD3		
2	3	35	HFD	100	25
1	3	40	HFD	100	25
1	3	15	HFD	100	25
1	3	60	HFD	100	25

Notes:

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PREPARED BY  
RONALD RANES

DATE  
7/31/2014

Eaton

APPROVED BY

DATE

JOB NAME

Monsanto

DESIGNATION

PP-Pilot

VERSION

1.0.0.1

TYPE

PRL3a

DRAWING TYPE

Customer Approval

NEG-ALT Number

E2070619X4K1-0000

REVISION

0

DWG SIZE

A

G.O.

ITEM

SHEET

1 of 1





## Detail Bill of Material

**Project Name:** Monsanto  
**General Order No:**

**Negotiation No:** E2070619X4K1  
**Alternate No:** 0000

Item No.	Qty	Product	Description
	1	Dry Type Transformers	Transformer Type: General Purpose Vented 3 Phase, 30 KVA, 1 K-Factor 480 Primary Volts 208Y/120 Secondary Volts 150C with 220C Insulation System Temperature Rise Copper Winding Material OSHPD Compliant (verify mounting method in OSP) NEMA 2 (N3R w/opt'l weathershield) Enclosure Type 60 HZ

**Catalog No** V48M28T30CUEE  
**Designation** PP-Pilot

Qty	List of Materials
1	3 Phase, 30 KVA, 480 Primary Volts, 208Y/120 Secondary Volts, 150C with 220C Insulation System Temperature Rise, Copper Winding Material, 60 HZ
1	Weathershield Kit for Frame 912B, 912D
1	Transformer Lug Kit/1PH 15-37.5KVA or 3PH 15-45KVA

Eaton Selling Policy 25-000 applies.

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.



## Dry-Type Transformers General Information

- Standard Transformer Catalog Number: V48M28T30CUEE
- Transformer Type: General Purpose Vented
- Phase: 3
- kVA: 30
- Primary Volts: 480
- Secondary Volts: 208Y/120
- Temperature Rise: 150C with 220C Insulation System
- Winding Material: Copper
- Enclosure Type: NEMA 2 (N3R w/opt'l weathershield)
- Frequency (Hz): 60
- Easy Install: N
- Frame: 912D
- Wiring Diagram: 280B
- Weight (lbs.): 329
- Impedance (%): 4.18
- UL Listed: Y
- OSHPD Compliant (verify mounting method in OSP): Y

## Standard Values

- K-Factor: 1
- TAPS: 2@+2.5%, 4@-2.5%
- Sound Reduction (dB): 0
- NEMA ST20 Sound Level (dB): 45
- NEMA TP-1 Energy Efficient: Y
- Infrared Viewing Window: None

## Field-Installed Accessories Included

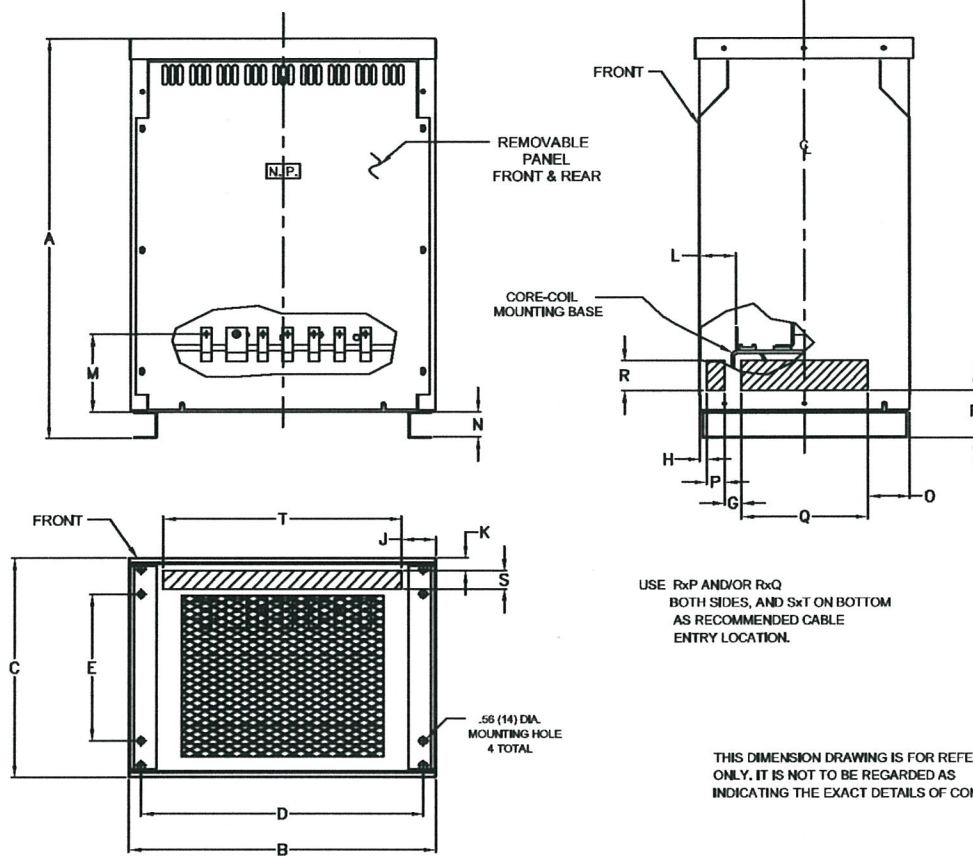
- Lug Kit: LKS1
- Weather Shield: WS38

The information on this document is created by Eaton. It is disclosed in confidence and it is only to be used for the purpose in which it is supplied.	PREPARED BY RONALD RANES		DATE 7/31/2014	<b>Eaton</b>		
	APPROVED BY		DATE	JOB NAME Monsanto		
	VERSION 1.0.0.1			DESIGNATION PP-Pilot		
NEG-ALT Number E2070619X4K1-0000				TYPE Dry-Type Transformer	DRAWING TYPE Customer Appr.	
	REVISION 0	DWG SIZE A	G.O.	ITEM	SHEET 1 of 1	



**NOTE:**

1. ALL UNITS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE NEMA, UL, ANSI, AND IEEE STANDARDS.
2. DRY-TYPE VENTILATED, CLASS AA, NEMA TYPE 2 ENCLOSURE.
3. FOR NEMA 3R OUTDOOR APPLICATION, USE WEATHERSHIELD # WS-38
4. TRANSFORMERS ARE FLOOR MOUNTED.
5. 220° C CLASS INSULATION SYSTEM.
6. PAINT COLOR IS ANSI #61.
7. ALUMINUM UNITS HAVE ALUMINUM WINDINGS AND TERMINATIONS.  
COPPER UNITS HAVE COPPER WINDINGS AND TERMINATIONS.



**DIMENSIONS IN INCHES (MM)**

FRAME	A	B	C	D	E	F	G	H	J	K
FR912D	29.99(762)	22.90(582)	16.42(417)	21.04(534)	11.00(279)	3.60(91)	1.24(31)	.50(13)	2.57(65)	.95(24)
	L	M	N	O	P	Q	R	S	T	
	2.72(69)	5.83(148)	1.89(48)	3.13(80)	1.36(35)	9.50(241)	2.26(57)	1.37(35)	17.77(451)	

Rev1-Oct/13

PRODUCT CODE: OL		FEDERAL ID NO.		DFTR S.BELTRAN	DATE 10/09/13	THE INFORMATION ON THIS DOCUMENT WAS CREATED BY EATON CORPORATION. IT WAS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT WAS SUPPLIED.				<b>EATON</b>
				APPD E.ROBLES	DATE 10/09/13	TITLE .DRY TYPE TRANSFORMER OUTLINE				
				S.O.		TYPE				OUTLINE
01	ECN076863 NEW FRAME	S.BELTRAN	E.ROBLES	10/09/13		G.D.				DWG <b>FR912D</b>
REVISIONS					REVISION <b>01</b>					SHEET 1 OF 01

GO/NEG-Alt-Date:  
E2070619X4K1-0000-7/31/2014

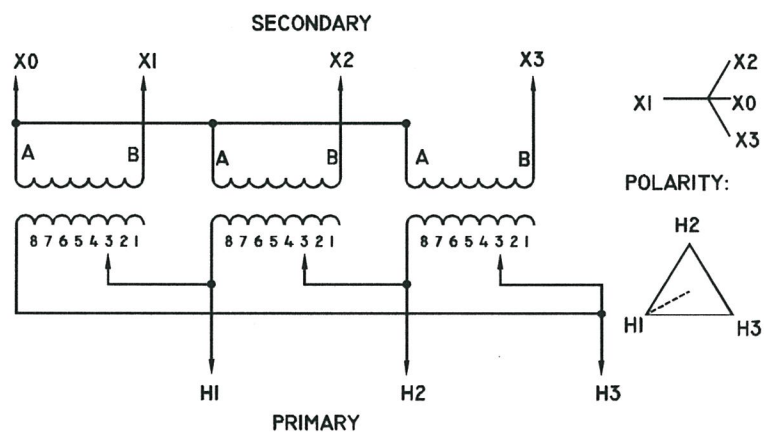
Job Name:  
Monsanto

Item Number:  
Catalog Number:  
V48M28T30CUEE

Designation:  
PP-Pilot



VOLTS	TAP
504	1
492	2
480	3
468	4
456	5
444	6
432	7



THE INFORMATION ON THIS DOCUMENT IS CREATED BY CUTLER-HAMMER. IT IS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT IS SUPPLIED.

DFTR HEG DATE 12/01/01  
 APPD EER DATE 12/01/01  
 S.O.

Cutler-Hammer

TITLE DRY TYPE TRANSFORMER  
 WIRING SCHEMATIC

TYPE TRANSFORMER

FEDERAL ID NO

PRODUCT CODE  
 TRANSFORMERS

REVISION  
 03

DWG SIZE  
 A

G.O.

DWG

280B

SHEET  
 01 OF 01

GO/NEG-Alt-Date:  
 E2070619X4K1-0000-7/31/2014

Job Name:  
 Monsanto

Item Number:  
 V48M28T30CUEE

Designation:  
 PP-Pilot



**ATTACHMENT B**  
**TEMPORARY WATER RIGHT FOR TW-75**



RECEIVED

ID No. TP-11-20.

STATE OF IDAHO  
DEPARTMENT OF WATER RESOURCES  
Department of Water Resources  
Eastern Region

**APPLICATION FOR TEMPORARY APPROVAL OF WATER APPROPRIATION**

(For a use not intended to become an established water right, not to exceed a total diverted volume of five (5) acre-feet, and not to exceed one (1) year duration in accordance with Section 42-202A, Idaho Code.)

Name of applicant: P4 Production, L.L.C. Phone: 547-1207  
Mailing address: P. O. Box 816 City: Soda Springs  
State Idaho ZIP 83276 Email: jim.r.smith@Monsanto.com

1. Source of water: groundwater tributary to N/A  
2. Location of point(s) of diversion:

TWP	RGE	SEC	GOVT LOT	1/4	1/4	1/4	County	Source	Local name or tag #
8S	42E	31			NW	SE	Caribou	Groundwater	TW-75

3. Location of place of use:

TWP	RGE	SEC	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
8S	42E	31	1	1	1	1													

4. Describe proposed use of water testing of water filtration equipment designed to remove selenium from groundwater supply
5. Amount of water:  
Maximum rate of diversion \_\_\_\_\_ cfs or 10 gpm.  
Maximum daily volume \_\_\_\_\_ AF; total volume 4 AF.
6. Duration of diversion: from Aug 1st, 2014 (day-month) to November 15 2014 (day-month).
7. Describe proposed diverting works: existing groundwater monitoring well
8. a. Who owns the property at the requested point of diversion? Applicant  
b. Who owns the land to be irrigated or place of use? Applicant  
c. If the property is owned by a person other than the applicant, describe the arrangement allowing access to the water:  
N/A
9. Additional remarks: See attached memo

I hereby acknowledge that I assume all risk if the diversion and use of the water under this approval injures other water rights. I certify this is a temporary use and that I am not seeking a continuing right to use water.

Thomas J. Smith Attorney For P4 July 8, 2014  
Signature of applicant Date

Received by SC Date 7/9/14 Time \_\_\_\_\_  
\$50.00 fee received by SC # 8640027 Date 7/9/14  
Watermaster comments received? \_\_\_\_\_ Date \_\_\_\_\_



**ACTION OF THE DIRECTOR, DEPARTMENT OF WATER RESOURCES**

This is to certify that the department has examined this application for temporary approval to use water under the provisions of Section 42-202A, Idaho Code, and has determined that:

☐ A. The application for temporary approval should be denied.

☒ B. The application for temporary approval should be approved, since

1. The temporary approval can be properly administered.
2. Other water sources are not readily available.
3. The approval is in the public interest.
4. The approval will not injure known public values associated with the water source or any known water rights.

This application is therefore hereby:

☐ A. DENIED

☒ B. APPROVED, subject to the following conditions:

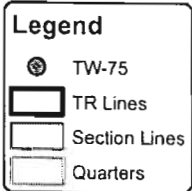
1. Diversion and use of water under this approval is subject to all valid existing water rights.
2. The applicant assumes all risk the use of the water under this approval may injure other water rights.
3. This approval authorizes a maximum diversion of 40 AF and a maximum rate of diversion of \_\_\_\_\_ cfs.
4. This approval does not grant a right-of-way across the land of another, does not create a continuing right to use the water and may not be used in connection with a use which requires a continuing water supply.
5. The department may cancel this approval at any time if the department identifies injury to other water rights.
6. This approval does not create a continuing right to use water.
7. The holder of this temporary permit shall not divert at a rate or in a manner that will significantly reduce the flow in the water source or otherwise adversely affect fish, wildlife or other public values.
8. Other: \_\_\_\_\_

9. This approval expires on November 15, 2014

Signed this 15th day of July, 2014.

Lyle Swank  
For the Director









## TECHNICAL MEMORANDUM

**Date:** July 3, 2014  
**To:** T.J. Budge, Legal Counsel  
**From:** Paul Pigeon, P.E., Karen Budgell  
**cc:** Jason Maughan, James McCulloch, Monsanto  
Tom Rutkowski, David Banton, Golder  
**Project No.:** 91311101-003  
**Company:** Racine, Olson, Nye, Budge,  
Bailey Law  
**Email:** [ppigeon@golder.com](mailto:ppigeon@golder.com)  
**RE: SELENIUM PILOT STUDY – TEST WATER SUPPLY FROM MONITORING WELL TW-75**

Monsanto Company (Monsanto) has authorized Golder Associates Inc. (Golder) to plan and implement a pilot test of a biological selenium treatment process for removal of selenium from groundwater at the Soda Springs plant (the Site). The biological treatment process selected for testing is a packed bed biofiltration technology known as ABMet™, supplied by GE Water and Process Technologies. The process will test selenium contaminated groundwater treatment at a low flow rate. Test Well 75 (TW-75), installed in 2013 for ground water monitoring, was selected based on its representative selenium concentrations and proximity to the selected location for pilot testing. A test period of three months (13 weeks) was selected as a sufficient period to obtain data from pilot operations.

The ABMet pilot is sized to take an influent flow rate of up to 10 gpm. Although the flow rate will be varied throughout the three-month test period to assess treatment capabilities for a range of selenium loading rates, the maximum potential flow rate of 10 gpm would necessitate pumping of a maximum of about 4 acre-feet (1,310,040 gallons) of groundwater from TW-75 during pilot testing. The actual volume pumped will be less as lower flow rates will be used during parts of the 13-week period. The pumped water will be fed to a supply tank at the pilot plant location and pumped to the top of the ABMet biofilter for gravity downflow filtration. A mixed nutrient liquid will be dosed at less than ¼ gallon per minute into the biofilter feed pipe to promote biological growth in the filter. The nutrient liquid will be supplied from an off-site source by GE Water and Process Technologies.

The water extracted from TW-75 will be monitored using a local-indicating flow meter and totalizer. Daily records will be maintained at the pilot location of flow rate in gallons per minute and total gallons used.

The biofilter effluent will be collected in an effluent/backwash tank for sampling and used as the backwash water for the biofilter. Periodically, effluent will be pumped into the bottom of the biofilter for short periods of time, for two purposes:

I:\09\09131101003\0122\91311101003 pilot test supply from tw-75 03jul14.docx

Golder Associates Inc.  
44 Union Boulevard, Suite 300  
Lakewood, CO 80228 USA

Tel: (303) 980-0540 Fax: (303) 985-2080 [www.golder.com](http://www.golder.com)

Golder Associates: Operations In Africa, Asia, Australasia, Europe, North America and South America

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- Degassing – The biofilter is operated under anaerobic conditions, which result in generation of gas bubbles in the bed and excess biomass, causing an increasing head loss in the biofilter. On a frequency of less than 1 day to 3 days, the back wash pump will be turned on for 30 seconds to one minute to purge gas from the filter bed and re-distribute the filter media.
- Backwash – On a frequency of 1 to 2 months, a full backwash of the biofilter will be accomplished to remove excess biomass, with a duration of 15 to 30 minutes.

Because degassing and backwashing will utilize biofilter effluent, these periodic steps will not add to the total volume of groundwater pumped from TW-75.

Essentially all groundwater processed through the ABMet equipment will be collected in a holding tank; small samples, totaling 1 to 5 gallons per day, will be collected and shipped off-site for analysis of selenium and other water quality parameters. Monsanto will handle the disposition of the treated test water.



## SPECIAL POWER OF ATTORNEY FOR WATER RIGHTS

P4 Production, L.L.C., hereby appoints Randall C. Budge of the law firm of RACINE OLSON NYE BUDGE & BAILEY, CHARTERED, 201 E. Center Street, Post Office Box 1391, Pocatello, Idaho 83204, its true and lawful attorney for the purpose of dealing with the Idaho Department of Water Resources relative to the management and transaction of water rights, and to allow him to receive all information, opinions, and records regarding water rights, and to sign and submit applications and other filings on its behalf. Unless previously withdrawn, this Special Power of Attorney for Water Rights will expire on November 30, 2018.

DATED this 12 day of November 2013.

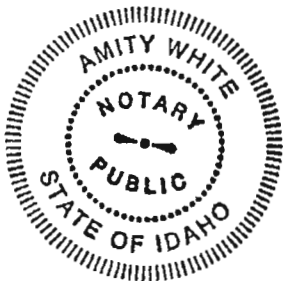
P4 PRODUCTION, L.L.C.

By: [Signature]  
Name: Sheldon Alver  
Title: Vice President Operations

STATE OF IDAHO )  
 ) ss  
County of Caribou )

On this 12<sup>th</sup> day of November 2013, before me, the undersigned, a Notary Public In and for said State, personally appeared Sheldon Alver, known or identified to me to be the Vice President Operations of P4 Production, L.L.C., who executed the instrument on behalf of said limited liability company, and acknowledged to me that such limited liability company executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and seal the day and year first above written.



NOTARY PUBLIC FOR IDAHO  
Commission expires: 7/21/14





RACINE  
OLSON  
NYE  
BUDGE  
BAILEY

201 E. Center St.  
P.O. Box 1391  
Pocatello, ID 83204  
O 208.232.6101  
F 208.232.6109  
racinelaw.net

RECEIVED  
JUL 09 2014  
Department of Water Resources  
Eastern Region

Thomas J. Budge  
tjb@racinelaw.net

July 8, 2014

Idaho Department of Water Resources  
Eastern Region  
900 North Skyline Drive, Suite A  
Idaho Falls, Idaho 83402-1718

**Re: Application for Temporary Approval of Water Appropriation  
P4 Production, L.L.C.**

Dear IDWR:

Enclosed please find an Application for Temporary Approval of Water Appropriation for P4 Production, L.L.C.

Sincerely,

THOMAS J. BUDGE

TJB:bh  
Enclosures





**State of Idaho**

**DEPARTMENT OF WATER RESOURCES**

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 [www.idwr.idaho.gov](http://www.idwr.idaho.gov)

---

C.L. "BUTCH" OTTER  
Governor

GARY SPACKMAN  
Director

July 16, 2014

P4 Production  
Jim R Smith  
PO Box 816  
Soda Springs ID 83276

Applicant:

Enclosed is your approved copy of Temporary Permit TP-11-20. Please take note of the effective dates on line 6 and the conditions on the back.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Sharla Cox'.

Sharla Cox  
Water Resource Administrative Assistant

Enclosure



**ATTACHMENT C**  
**SCOPE OF INSTALLATION**



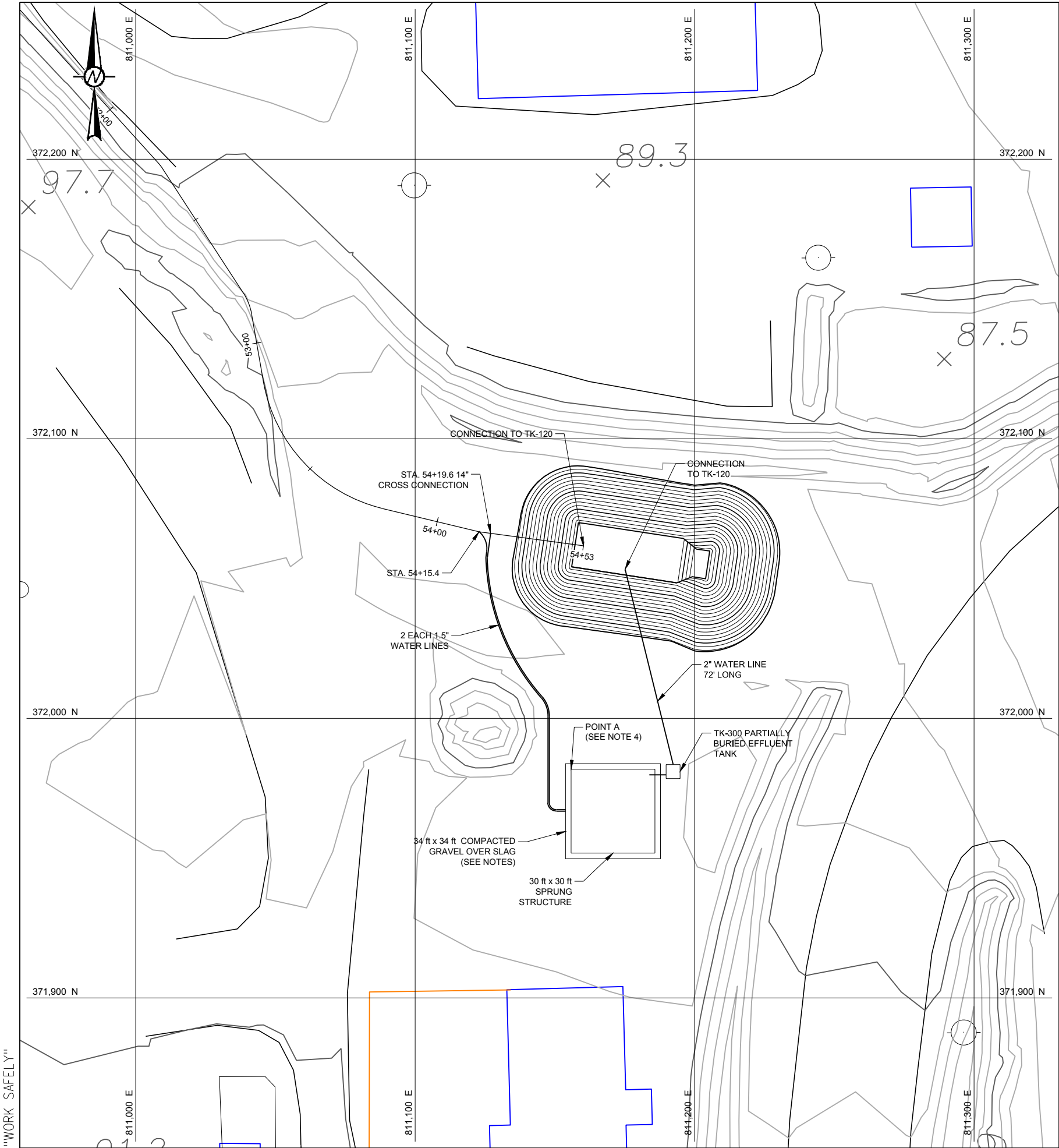
**Attachment C: Scope of Installation for Pilot**

Line	Lead	Support	Item	Monsanto Resources
1	Monsanto		Permit investigation for Sprung structure	
2	Monsanto		Prepare the pilot site (grade and divert surface water)	
3	Golder	Monsanto	Install TW-75 pump and controls	
4	Golder	Monsanto	Set up generator and connect electric to TW-75 pump	
5	Golder		Install above grade piping at TW-75	
6	Monsanto		Trench and lay underground piping from TW-75 to the pilot	
7	Golder	Monsanto	Install TW-58A pump at T-Sump	
8	Golder	Monsanto	Connect electric to TW-58A pump	
9	Golder		Install above grade piping at TW-58 T-Sump	
10	Monsanto		Trench and lay underground piping from the T-Sump to the pilot	
11	Monsanto		Trench and lay underground piping from pilot effluent tank (TK-300) to TK-120	
12	Monsanto		Conduct earth anchor pull test	90 lb jack hammer
13	Monsanto		Install earth anchors	90 lb jack hammer
14	Monsanto	Golder	Unload and erect ABMet Tower	Crane, man lift
15	Monsanto	Golder	Load GAC inside Tower	
16	Monsanto	Sprung	Erect Sprung structure	Crane, man lift, fork lift
17	Monsanto	Golder	Set tanks inside the pilot	Fork lift
18	Golder	GE	Interconnect pilot equipment	
19	Golder		Install above grade influent pipes to pilot	
20	Golder		Install above grade effluent piping to TK-300	
21	Monsanto	Golder	Bury and set TK-300	
22	Golder		Install P-300 and sensors	
23	Monsanto	Golder	Connect interlock (TK-300 LHH alarm) to TK-120 control panel	
24	Monsanto		Provide and install electrical power supply to the pilot	Electrician
25	Monsanto		Provide and install electrical distribution inside the structure and to the make-up air unit	Electrician
26	Monsanto	Golder	Install pilot interior lighting	Boom
27	Monsanto		Install make-up air unit and duct work	Fork lift
28	Golder	Monsanto	Install tank vents	Boom
29	Golder		Install tank drains	



**ATTACHMENT D**  
**DESIGN DRAWINGS**





NOTES

- PILOT PLANT PAD AREA SHALL CONSIST OF PREPARED SUBGRADE SURFACE OVER WHICH A COMPACTED GRAVEL LAYER IS PLACED. THE SUBGRADE SURFACE SHALL BE GRADED SUCH THAT THERE IS A MAXIMUM OF 1 FOOT OF ELEVATION DIFFERENCE OVER 30 FEET (I.E., FROM ONE SIDE OF THE PAD TO THE OTHER). PAD SHALL BE CONSTRUCTED SUCH THAT THE FINISHED SURFACE IS RAISED A MINIMUM OF 2 INCHES ABOVE THE SURROUNDING TERRAIN ON ALL SIDES.
- GRAVEL SHALL BE WELL-GRADED AND HAVE A MIX OF PARTICLE SIZES (I.E., FINES, SAND, GRAVEL). ALL PARTICLES SHALL BE LESS THAN ¾" IN DIAMETER. GRAVEL SHALL BE PLACED IN A SINGLE 2-INCH THICK (MINIMUM) LIFT OVER THE PREPARED SUBGRADE SURFACE.
- SUBGRADE SHALL BE COMPACTED PRIOR TO GRAVEL PLACEMENT. PILOT PLANT PAD AREA SHALL BE COMPACTED AGAIN FOLLOWING GRAVEL PLACEMENT. COMPACTION SHALL BE VIA TRAFFICKING WITH HAUL TRUCKS AND CONSTRUCTION EQUIPMENT, OR USING AN ENGINEER-APPROVED COMPACTOR. MATERIALS SHALL BE COMPACTED SUCH THAT ADDITIONAL PASSES OF THE EQUIPMENT DO NOT RESULT IN REDUCTION OR EVIDENT DEFLECTION OF THE SURFACE UNDER THE ACTION OF THE EQUIPMENT.
- LATITUDE/LONGITUDE OF POINT A (NW CORNER SPRUNG STRUCTURE) IN DECIMAL DEGREES NAD83. LAT: 42.686008307, LONG: 111.590213315

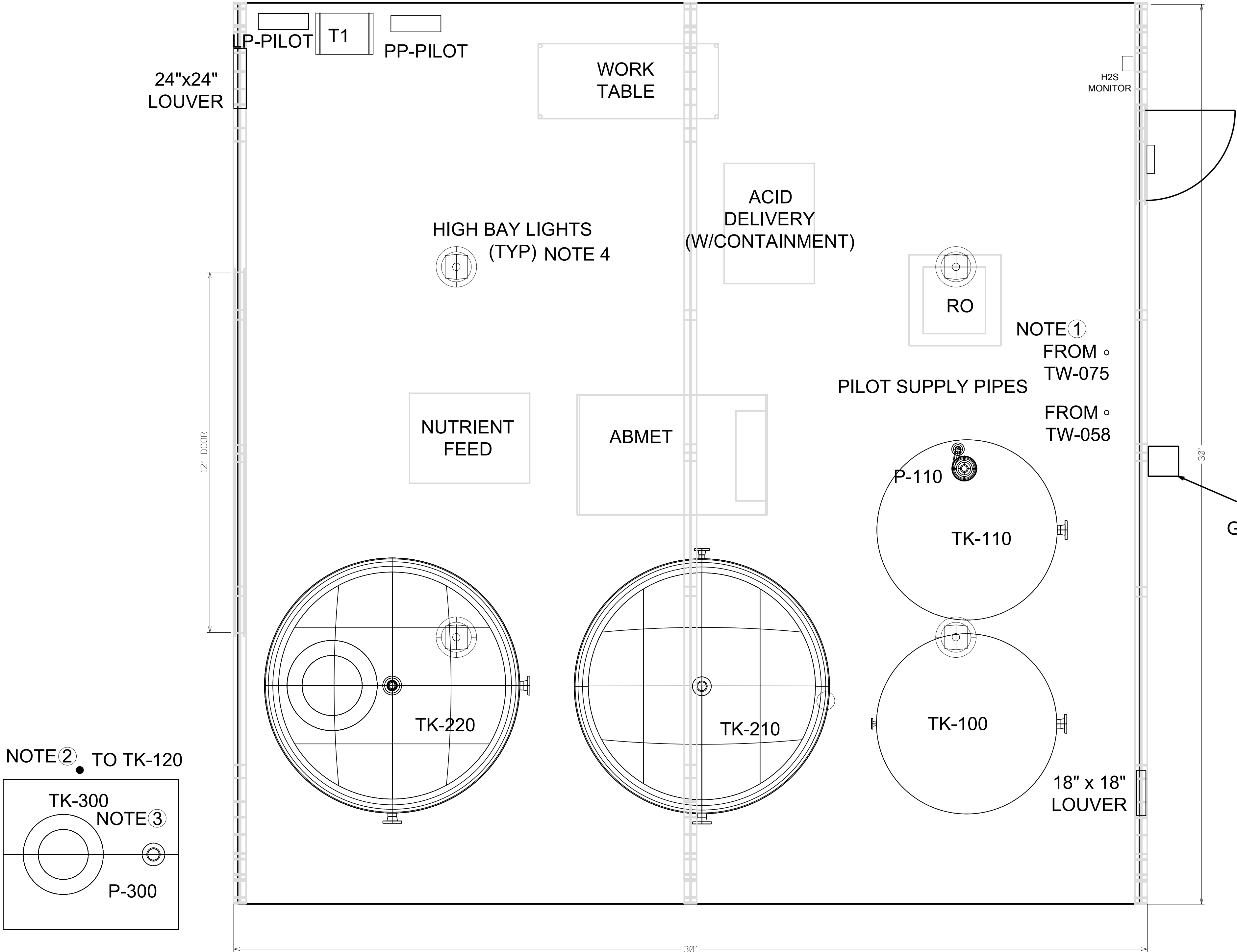


DRAFT  
NOT FOR CONSTRUCTION

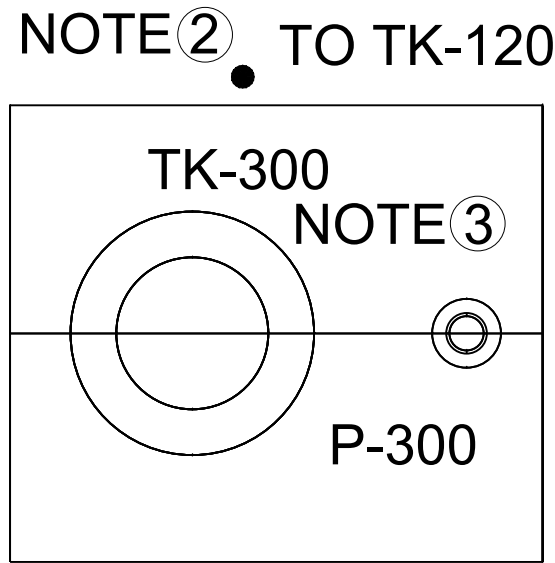
A	MTM	ISSUED FOR CLIENT REVIEW				PEP
	31JULY14					31JULY14
PROJECT NO.	BY	CHECKED	APPROVED	DATE	DATE	
REV.	DESCRIPTION					
<div><div>MONSANTO</div><div><p>MONSANTO SODA SPRINGS PLANT 1853 HIGHWAY 34 P.O. BOX 816 SODA SPRINGS, ID 83278</p><p>THIS DRAWING IS THE CONFIDENTIAL PROPERTY OF MONSANTO COMPANY AND IS TO BE USED ONLY BY AUTHORIZED PERSONNEL AND THE INTEREST OF MONSANTO. IT MUST BE ACCOUNTED FOR, SHALL NOT BE REPRODUCED IN WHOLE OR PART WITHOUT PRIOR WRITTEN PERMISSION FROM MONSANTO AND MUST BE RETURNED TO MONSANTO AGRICULTURAL COMPANY'S ENGINEERING DEPARTMENT AT ANY TIME UPON REQUEST, BUT IN ANY EVENT AT COMPLETION OF THE WORK OR JOB. THE RECIPIENT AGREES TO KEEP CONFIDENTIAL, AND TO REQUIRE HIS/HER EMPLOYEES TO KEEP CONFIDENTIAL, THE INFORMATION CONTAINED HEREON SHALL BE MADE ONLY TO THOSE PERSONS WHO REQUIRE SUCH INFORMATION FOR THEIR WORK ON MONSANTO'S PROJECTS.</p></div></div>						
PLANT SODA SPRINGS PLANT						
SITE PLAN PILOT PLANT						
DRAWN	BY	DATE	APPROVED	DATE	SITE	
CHECKED	MTM	8JULY14	PEP	3AUG14		
DESIGNED	PEP	8JULY14			SCALE AS NOTED	
	CAB					
PROJECT NO.		BUS. UNIT/GROUP	DEPT/SUB-GROUP	TYPE	NUMBER	
SIZE	SITE DRAWING NO.				REV.	
B	----				A	








- NOTES;
- ① ALL UNDERGROUND PIPING TO DAYLIGHT 24" ABOVE GROUND AND VERTICAL
  - ② EFFLUENT PIPELINE TO TK-120 FROM TK-300 TO DAYLIGHT 24" ABOVE GROUND AND VERTICAL.
  - ③ TK-300 TO BE INSTALLED WITH TOP OF TANK AT GROUND LEVEL. MANWAY LID SHALL BE ABOVE GROUND.
  - ④ LIGHTS TO BE SUSPENDED FROM SPRUNG STRUCTURE USING WIRE ROPE CABLE OR OTHER SUITABLE SUPPORT.(FIELD LOCATE)
  - ⑤ GE CELLULAR MODEM TO BE MOUNTED ON SPRUNG STRUCTURE FACING SODA SPRINGS.



3 SEPTEMBER 2014  
ISSUED FOR CONSTRUCTION

D	KMB	3SEPT14	ISSUED FOR CONSTRUCTION		PEP	3SEPT14
C	KMB	22AUG14	ISSUED FOR CONSTRUCTION		PEP	22AUG14
B	KMB	5AUG14	ISSUED FOR DESIGN REVIEW		PEP	5AUG14
A	KMB	21JULY14	ISSUED WITH TEST PLAN FOR REVIEW		PEP	21JULY14
PROJECT NO.		BY	CHECKED	APPROVED	APPROVED	
		DATE	DATE	DATE	DATE	
REV.	DESCRIPTION					
<div>MONSANTO SODA SPRINGS PLANT 1853 HIGHWAY 34 P.O. BOX 816 SODA SPRINGS, ID 83276</div> <div> <b>MONSANTO</b>™</div> <div>COMPANY CONFIDENTIAL THIS DRAWING IS THE CONFIDENTIAL PROPERTY OF MONSANTO COMPANY AND IS TO BE USED ONLY BY AUTHORIZED PERSONNEL AND THE INTEREST OF MONSANTO. IT MUST BE ACCOUNTED FOR, SHALL NOT BE REPRODUCED IN WHOLE OR PART WITHOUT PRIOR WRITTEN PERMISSION FROM MONSANTO, AND MUST BE RETURNED TO MONSANTO AGRICULTURAL COMPANY'S ENGINEERING DEPARTMENT AT ANY TIME UPON REQUEST, BUT IN ANY EVENT AT COMPLETION OF THE WORK OR JOB. THE RECIPIENT AGREES TO KEEP CONFIDENTIAL, AND TO REQUIRE HIS/ITS EMPLOYEES TO KEEP CONFIDENTIAL, THE INFORMATION CONTAINED HEREON SHALL BE MADE ONLY TO THOSE PERSONS WHO REQUIRE SUCH INFORMATION FOR THEIR WORK ON MONSANTO'S PROJECTS.</div>						
PLANT		SODA SPRINGS PLANT				
PILOT PLANT GENERAL ARRANGEMENT						
BY		DATE	APPROVED	DATE	SITE	
DRAWN	KMB	3SEPT14			SCALE	
CHECKED	PEP	3SEPT14			NONE	
DESIGNED	KMB	3SEPT14				
PROJECT NO.		BUS. UNIT/GROUP	DEPT./SUB-GROUP	TYPE	NUMBER	
SIZE	SITE DRAWING NO.					REV.
D	9131101003-1000-G-001					D





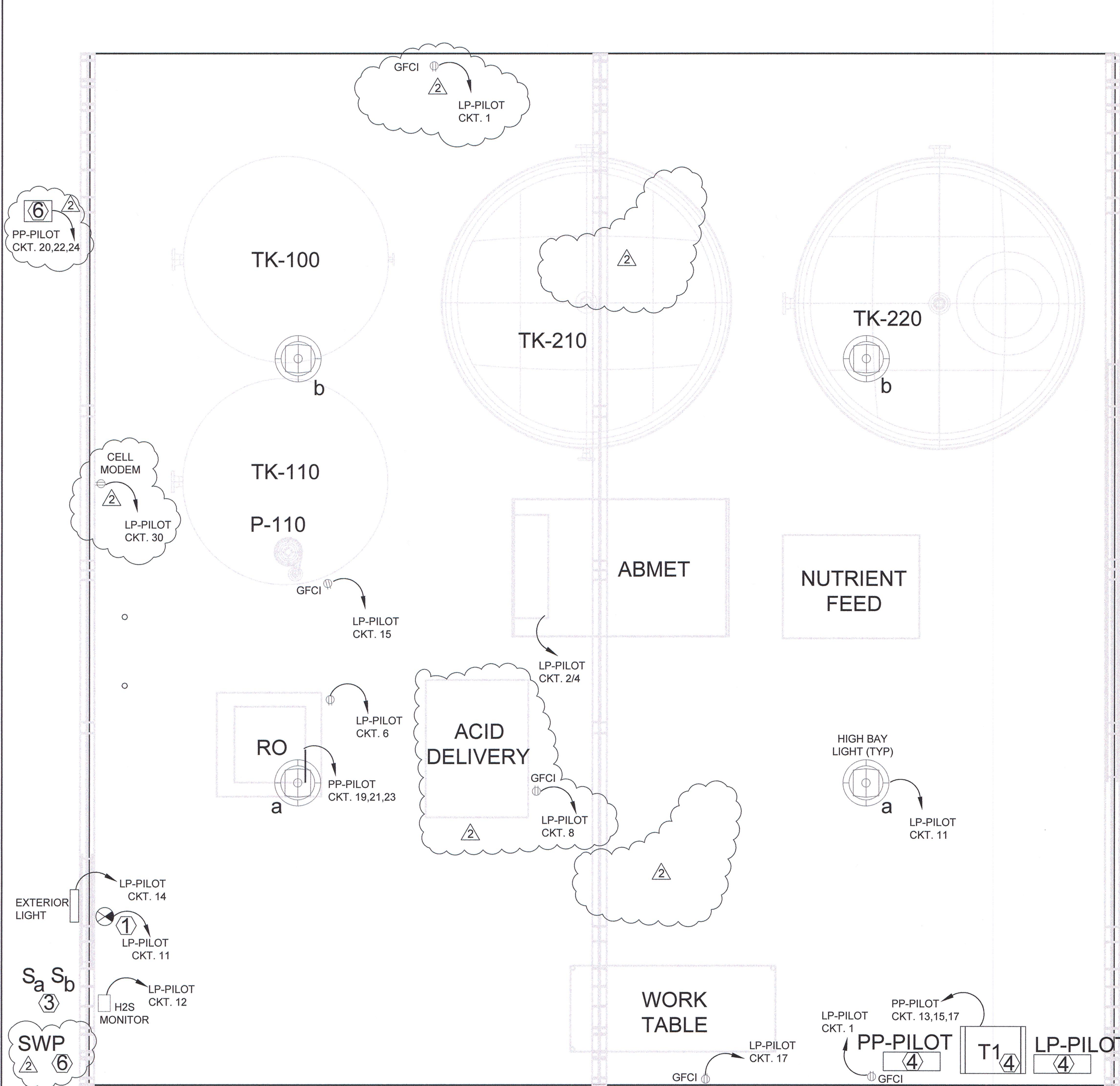
"WORK SAFELY"











NTS A PILOT PLANT- POWER, LIGHTING & RECEPTACLE PLAN 5 2 2

ELECTRICAL KEYED NOTES:

1. PROVIDE EXIT LIGHTING FIXTURE WITH INTEGRAL TWIN LED EMERGENCY ILLUMINATION HEADS: COORDINATE MOUNTING METHOD AND POINT LOADING WITH SPRUNG. MOUNT NEAR, AND PREFERABLY ABOVE, EXIT DOOR AT INTERIOR OF SPACE. UNIT EQUIPMENT WITH INTEGRAL MAINTENANCE-FREE NICKEL-CADMIUM BATTERIES AND CHARGER; DUAL-VOLTAGE CAPABILITY (120/277V); UNIVERSAL, DIRECTIONAL CHEVRON INSERTS BOTH REMOVABLE AND REINSERTABLE; UL-924 DAMP LOCATION RATED WITH 90-MINUTE MINIMUM BATTERY OPERATION; INTEGRAL TEST SWITCH AND PILOT LIGHT, WHITE HOUSING, AND GREEN-COLOR LETTERS. DESIGN BASIS: LITHONIA LHQM\_LED\_G.
2. PROVIDE ELECTRIC UNIT HEATER RATED 480/3/60: WITH THE FOLLOWING: COORDINATE POSITIONS WITH EQUIPMENT. INDIVIDUAL ADJUSTABLE LOUVERS SHALL BE FURNISHED TO PROVIDE DESIRED CONTROL OF DISCHARGE AIR. AUTOMATIC RESET THERMAL OVERHEAT PROTECTION WIRED FOR INSTANTANEOUS PILOT OPERATION OF BUILT-IN CONTROL CONTACTOR HOLDING COIL. HEATERS WHICH DRAW MORE THAN 48 AMPERES SHALL HAVE BUILT-IN BRANCH CIRCUIT FUSING FOR PROTECTION. MOTORS: TOTALLY ENCLOSED CONTINUOUS DUTY WITH BUILT-IN THERMAL OVERLOAD PROTECTION. INDIVIDUAL INTEGRAL COMFORT CONTROL THERMOSTAT SWITCH; INTEGRAL DISCONNECT SWITCH. UL LISTED AND CSA CERTIFIED AND MEET THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. 30KW DESIGN BASIS: DAYTON PORTABLE ELECTRIC HEATER: 1RKU2.
3. PROVIDE MULTIPLE-LEVEL (0%, 50%, 100%) SWITCHING FOR GENERAL ILLUMINATION OVERHEAD LIGHTING FIXTURES. PROVIDE WEATHER PROOF SWITCH ENCLOSURES.
4. EQUIPMENT SHALL PROVIDE CAPACITIES AND CHARACTERISTICS OF EATON DESIGN BASIS EQUIPMENT SELECTION SEVEN (7) PAGES) ATTACHED, AND INCORPORATED HEREIN.
5. COORDINATE WITH SPRUNG FOR POSITIONS OF MUA-1, AND PENETRATIONS FOR SUPPLY DUCT EXHAUST DAMPER, AND EXTERIOR WEATHER LOUVER.
6. MUA-1; FAN CONTROL SWITCH
7. PROVIDE 0.75 INCH RACEWAY AND INSTRUMENTATION CABLE (PER GENERAL ELECTRICAL NOTES) FOR LSHH-300 TO MONSANTO-PROVED DELTA V CONTROL PANEL AT TK-120 LOCATION. COORDINATE ROUTING WITH TK-300 EFFLUENT PIPING. REQUEST MONSANTO TO TERMINATE CONDUCTORS AND PERFORM PROGRAMMING. PROVIDE VISUAL INDICATION, AT EXTERIOR OF DELTA V CONTROLLER, ACTIVATED WHEN LSHH-300 LEVEL IS EXCEEDED.



0 2 4  
SCALE FEET

2	RRR	22AUG14	EQUIPMENT MOVED & REVISED	RJA	22AUG14
	RRR	5AUG14	EQUIPMENT MOVED AND ADDED	RJA	5AUG14
1	RRR	31JULY14	ISSUED FOR CONSTRUCTION	RJA	31JULY14

PROJECT NO.	BY	CHECKED	APPROVED	DATE	DATE	DATE	DATE
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REV: DESCRIPTION

MONSANTO SODA SPRINGS PLANT  
1853 HIGHWAY 34  
P.O. BOX 516  
SODA SPRINGS, ID 83276  
COMPANY CONFIDENTIAL  
THIS DRAWING IS THE CONFIDENTIAL PROPERTY OF MONSANTO COMPANY AND IS TO BE USED ONLY BY AUTHORIZED PERSONNEL AND THE INTEREST OF MONSANTO. IT MUST BE ACCOUNTED FOR, SHALL NOT BE REPRODUCED IN WHOLE OR PART WITHOUT PRIOR WRITTEN PERMISSION FROM MONSANTO. IT MUST BE RETURNED TO MONSANTO AGRICULTURAL COMPANY'S ENGINEERING DEPARTMENT AT ANY TIME UPON REQUEST, BUT IN ANY EVENT AT COMPLETION OF THE WORK OR JOB. THE RECIPIENT AGREES TO KEEP CONFIDENTIAL, AND TO REQUIRE HIS/HER EMPLOYEES TO KEEP CONFIDENTIAL, THE INFORMATION CONTAINED HEREON SHALL BE MADE ONLY TO THOSE PERSONS WHO REQUIRE SUCH INFORMATION FOR THEIR WORK ON MONSANTO'S PROJECTS.

PLANT SODA SPRINGS PLANT

PILOT PLANT  
POWER, -LIGHTING & RECEPTACLE PLAN

DRAWN	BY	DATE	APPROVED	DATE	SITE
CHECKED	RRR	22AUG14			SCALE
DESIGNED	RJA	22AUG14			NONE

PROJECT NO.	BUS. UNIT/GRUP	DEPT/SUB-GROUP	TYPE	NUMBER
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SIZE	SITE DRAWING NO.	REV
D	9131101003-1000-E-002	2





**ATTACHMENT E  
EQUIPMENT LIST**



Attachment E: Pilot System Equipment List

Line	Responsible Party -Supply	Name	Description
1	Golder	TW-75 Pump	20 gpm well pump in TW-75
2	Golder	TW-75 Controller	CU301, wire, splice kit, R100
3	Golder	TW-75 Pump Controller Enclosure	Hoffman Box
4	Monsanto	TW-75 to Pilot Piping	1.5" HDPE buried
5	Golder	Diesel Powered Honda Generator	Diesel Powered Honda Generator
6	Monsanto	TW-58 Pipeline to Pilot Piping	1.5" HDPE buried
7	Golder	P-58A Pump	Dayton 55 gpm sub pump in T-Sump
8	GE	TK-200 ABMet Tower	47.75"(W) x 75"(L) x 196"(H) tower
9	GE	TK-100 ABMet Equalization Tank	1,000 gallon fiberglass; 64"(D) x 77.5"(L)
10	GE	P-200 ABMet Feed Pump	1-10 gpm on ABMet Skid
11	GE	Nutrient Feed Pump	Variable speed
12	GE	Nutrient Supply Tote	150 gallon; 36"(W) x 46"(L) x 46"(H)
13	GE	Carbon Bags	1,600 lbs (1 supersack + 4-50lb bags) for Tower
14	GE	P-210 ABMet Backwash Pump	25-100 gpm on ABMet Skid
15	GE	TK-210 ABMet Effluent Tank	1,550 gallon; 87"(D) x 67"(H)
16	GE	TK-220 ABMet Spent Backwash Tank	500 gallon cone bottom; 52"(D) x 81"(H)
17	GE	P-130 Acid Feed Pump	Variable speed set on nearby table
18	GE	TK-130 Acid Supply Drum	15 gallon; 14"(D); secondary containment
19	GE	RO System	Includes filters; 75% recovery; 27"(W) x 28"(L) x 65"(H)
20	GE	TK-110 RO Equalization Tank	1,000 gallon fiberglass; 64"(D) x 77.5"(L)
21	GE	P-110 RO Sump Pump	10 gpm sump pump in TK-110
22	GE	Cartridge Filters	10 and 1 micron filters on RO Skid
23	GE	RO Feed Pump	1-10 gpm on RO Skid
24	Golder	TK-300 Effluent Collection Tank	600 gallon tank - 42" (D) x 101.5" (L)
25	Golder	TK-300 Level Sensor	in TK-300
26	Golder	P-300 Effluent Pump	80 gpm in TK-300
27	Monsanto	Effluent Piping	2" HDPE buried
28	Sprung	Sprung Structure (Sprung Structure Quotation August 5, 2014 (for information))	30' x 30' aluminum frame, tensioned membrane
29	Monsanto	Pilot Electrical Supply (Eaton No. E2070619X4K1 or equal (for Monsanto purchase))	Temporary Panel
30	Sprung	Lighting	4 - 400 W bay lights
31	Golder	Unit Heaters, electric	2 ea 30 kw
32	CFM	Makeup Air unit with louver/damper (CFM Company No. 27215-DN-02 (for information))	100% outside air, electric heating
33	CFM	Duct work, nozzle (CFM Company No. 27215-DN-02 (for information))	passive vents
34	Golder	tank vents, drains, pumps to tanks	n/a
35	Golder	Portable eye wash and preservative	n/a
36	Golder	Portable welder	n/a
37	Golder	misc. fittings, pipe, valves	n/a





**ATTACHMENT F**  
**SAMPLING AND ANALYTICAL PLAN**



**Attachment F1: ABMet Analytical Suite and Sampling Frequency Table - Influent and Effluent**

Long List - Monthly	Short List (Wednesday, Friday)	One time List
Field Parameters <sup>1</sup>	Field Parameters <sup>1</sup>	Analytical Parameters
pH	pH	Long list on spent BW <sup>4</sup>
Temperature	Temperature	TCLP on spent BW <sup>4</sup>
Conductivity	Conductivity	WET on effluent
ORP	ORP	
DO	DO	
Analytical Parameters	Analytical Parameters	
Se, Total <sup>2</sup>	Se, Total	
Se, Dissolved (0.45 micron filter)	Se, Dissolved (0.45 micron filter)	
Se, Speciation <sup>3</sup>	Nitrate	
Se, Dissolved (0.15 micron filter)	Sulfide	
Se, Total	COD	
Se, Dissolved (0.45 micron filter)		
Metals, Total - Ca, Cd, Mn, Mo		
Metals, Dissolved - Ca, Cd, Mn, Mo		
Nitrate		
Nitrite		
Sulfate		
Sulfide		
Orthophosphate		
COD		
BOD, total		
BOD, soluble		
TOC		
Alkalinity		
TDS		
TSS		
Chloride		

## Notes:

1. Flow rate and instrument monitoring will also be required.

2. Parameters in purple will be submitted to ASC. All other analytical parameters will be sent to SVL.

3. Selenium species include Se(IV), Se(VI), SeCN, MeSe(IV), and an estimate of other dissolved species.

4. Sample should be taken from initial backwash flush which should contain the greatest amount of solids.

Field blanks consist of a set of sample bottles filled with DI water in the field during sampling and will be collected at a rate of 5%.

Blind duplicates consist of an additional set of sample bottles filled with process water during sampling and will be collected at a rate of 10%.



**Attachment F2: RO Analytical Suite and Sampling Frequency Table - Influent, Permeate, Brine**

Long List - Weekly (Monday)	Short List (Wednesday, Friday)	Monthly List	One time List
Field Parameters <sup>1</sup>	Field Parameters <sup>1</sup>	Analytical Parameters	Analytical Parameters
pH	pH	Se, Speciation <sup>4</sup>	WET on effluent
Temperature	Temperature	Se, Dissolved (0.15 micron filter)	
Conductivity	Conductivity	Se, Total	
SDI	Analytical Parameters	Se, Dissolved (0.45 micron filter)	
Analytical Parameters	Se, Total		
Se, Total <sup>2</sup>	Se, Dissolved <sup>3</sup> (0.45 micron filter)		
Se, Dissolved (0.45 micron filter)			
Metals, Total - Al, Ba, Ca, Cd, Fe, Mg, K, Mn, Mo, Na, Si, Sr			
Metals, Dissolved <sup>4</sup> - Al, Ba, Ca, Cd, Fe, Mg, K, Mn, Mo, Na, Si, Sr			
Anions - Br, Cl, F, SO <sub>4</sub>			
Alkalinity			
Hardness			
Nitrate			
Silica			
TDS			
TSS			

## Notes:

1. Flow rate and instrument monitoring will also be required as detailed in operation manuals.

3. Parameters in purple will be submitted to ASC. All other analytical parameters will be sent to SVL.

3. No dissolved metals analysis on permeate stream.

4. Selenium species include Se(IV), Se(VI), SeCN, MeSe(IV), and an estimate of other dissolved species.

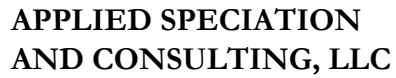
Field blanks consist of a set of sample bottles filled with DI water in the field during sampling and will be collected at a rate of 5%.

Blind duplicates consist of an additional set of sample bottles filled with process water during sampling and will be collected at a rate of 10%.



**ATTACHMENT G**  
**CHAIN OF CUSTODY FORMS**





Phone (425) 483-3300  
Fax (425) 483-9818

Company Name:	ASC Project Manager:
Contact Person:	By submitting of samples the client agrees to all terms and conditions set forth in the quotation provided by the ASC project manager. If you are not familiar with the term and conditions associated with your project, please contact your ASC representative as soon as possible (425) 483-3300.
Address:	
Phone Number:	
Fax Number:	Requested Turn Around Time:
Email Address:	Method of Sample Delivery:
Project Name:	Courier Tracking Number:
Project Number:	Confirmation of Sample Reception: <input type="checkbox"/> Yes <input type="checkbox"/> No
PO Number:	

[illegible]

Relinquished by: (sign)_____ (print)_____ Date/Time:_____	Comments:
Received by: (sign)_____ (print)_____ Date/Time:_____	Temp:
Relinquished by: (sign)_____ (print)_____ Date/Time:_____	Comments:
Received by: (sign)_____ (print)_____ Date/Time:_____	Temp:

\* Matrix: Air, Freshwater (FW), seawater (SW), groundwater (GW), wastewater (WW), soil (SL), sediment (SD), tissue (TS), product (P), other (O)







**ATTACHMENT H**  
**DAILY LOGS**



**Golder Pilot O&M Checklist**

Page \_\_\_\_ of \_\_\_\_

Directions: For the questions below, answer yes (Y) or no (N). If any answer deviates from the expected response, marked as [Y] or [N], please contact Gc

Checklist	Expected	Enter Date:	Enter Date:	Enter Date:	Enter Date:	Enter Date:	Enter Date:	Enter Date:
<b>Daily</b>								
Have the bump test been completed and documented for the fixed gas monitors at daily personal monitors?	[Y]							
For all tanks in use, are the ventilation valves open?	[Y]							
Are the ambient ventilation fans running?	[Y]							
Are the ambient ventilation fans making any unusual noise?	[N]							
Is anything blocking the inlet louvers?	[N]							
Are the heaters running if needed?	[Y]							
Is there any liquid in the spill containment drums? If [Y], empty containment drums.	[N]							
Record influent flow to ABMet Influent Equalization Tank and adjust as necessary, document	[Y]							
Record influent flow to RO Influent Equalization Tank and adjust as necessary, document	[Y]							
Record level of nutrient feed and acid on graduated cylinders, document	[Y]							
<b>Daily Prior to Leaving Site</b>								
Does effluent flow from the Effluent Collection Tank appear appropriate?	[Y]							
<b>Monthly</b>								
Have the fire extinguishers been inspected for a full charge and mixed by shaking?	[Y]							
Was the fire extinguisher inspection tag completed?								
<b>Quarterly</b>								
Have the fixed gas monitor sensors been calibrated and the results documented?	[Y]							



**Golder Pilot Reverse Osmosis Log**

Page \_\_\_\_ of \_\_\_\_

Directions: Complete the log each day an operator works in the structure. The RO must be running for several minutes before collecting readings.

Date								
Time								
Initials								
Pre-filter Pressure								
Post-filter Pressure								
Primary Pressure								
Final Pressure								
Permeate Pressure								
Permeate Flow								
Concentrate Flow								
Recycle Flow								
Inlet Cond.								
Permeate Cond.								
Pre-filters Changed?								



## Golder Pilot Fixed Gas Monitor Calibration

Page \_\_\_\_ of \_\_\_\_

Directions: Complete daily when on-site. The person performing the task should initial and add any comments.

For bump test, mark pass (P) if sensor detected the known H<sub>2</sub>S concentration; otherwise, mark fail (F) and provide explanation. If test was failed, sensors should be recalibrated and tested again.

[illegible]



## Golder Pilot Personal Gas Monitor Calibration

Directions: Complete daily for personal monitors when in use. The person performing the task should initial and add any comments.

For fresh air calibration, mark yes (Y) if completed; otherwise, mark no (N) and provide explanation.

For bump test, mark pass (P) if sensor detected the known H<sub>2</sub>S concentration; otherwise, mark fail (F) and provide explanation. If test was failed, sensors should be recalibrated and tested again.

[illegible]



## Golder Pilot Access Log

Page \_\_\_\_\_ of \_\_\_\_\_

[illegible]